

Exhibit 2

**EXPERT REPORT
OF
ROBERT FARRELL**

**In the matter of
Alaska Electrical Pension Fund v. Bank of America,
Case No. 14-cv-7126 (JMF) (S.D.N.Y.)**

**HIGHLY CONFIDENTIAL
SUBJECT TO PROTECTIVE ORDER**

July 28, 2017

QUALIFICATIONS	1
SCOPE OF ASSIGNMENT	3
BACKGROUND	8
A. Derivatives, Benchmarks, and the Need for ISDAfix Rates.....	8
B. Use of Industry Jargon, Generally	12
C. “Timestamps” on Swaps and Treasury Trades Brokered by ICAP	15
D. The Process for ISDAfix Rates.....	16
OPINION	19
I. THE USD ISDAFIX REFERENCE RATE PROCESS, AND DEFENDANTS’ RUBBERSTAMPING PRACTICE, CREATED AN OPPORTUNITY FOR MANIPULATION	19
II. EVIDENCE OF MANIPULATION ON SPECIFIC DAYS	22
1) <i>UBS and RBS play</i> [REDACTED]	22
2) <i>Barclays and ICAP discuss strategy to</i> [REDACTED] [REDACTED]	22
3) <i>Barclays tells ICAP</i> [REDACTED] [REDACTED]	23
4) <i>Goldman tells ICAP</i> [REDACTED] [REDACTED]	24
5) <i>Goldman tells ICAP broker</i> [REDACTED] [REDACTED]	25
6) <i>RBS tells ICAP it wants to</i> [REDACTED] [REDACTED]	28
7) <i>Barclays tells ICAP</i> [REDACTED] [REDACTED]	29
8) <i>JPMorgan gives a lesson in</i> [REDACTED] [REDACTED]	30
9) <i>Deutsche Bank engages in</i> [REDACTED]	31
10) <i>RBS and ICAP plan, then implement</i> [REDACTED] [REDACTED]	32
11) <i>Barclays tells ICAP</i> [REDACTED] [REDACTED]	35

12)	<i>ICAP</i>	37
13)	<i>Barclays tells ICAP broker:</i>	38
14)	<i>Barclays trader tells ICAP:</i>	40
15)	<i>Citi tells ICAP:</i>	41
16)	<i>Morgan Stanley tells ICAP</i>	42
17)	<i>Credit Suisse thanks ICAP</i>	42
18)	<i>Barclays tells ICAP</i>	43
19)	<i>Citi traders</i>	44
20)	<i>Citi tell ICAP it has</i>	45
21)	<i>BNPP advertises internally:</i>	47
22)	<i>Citi tells ICAP</i>	48
23)	<i>ICAP agrees with Barclays</i>	49
24)	<i>BNPP agrees internally</i>	50
25)	<i>Barclays tells ICAP</i>	51
26)	<i>Barclays tells ICAP:</i>	52
27)	<i>Barclays tells ICAP:</i>	53
28)	<i>BNPP discusses</i>	53

29)	<i>Barclays tells ICAP:</i>	[REDACTED]	54
30)	<i>Citi sells Treasuries</i>	[REDACTED]	55
31)	<i>Credit Suisse</i>	[REDACTED]	56
32)	<i>Citi traders</i>	[REDACTED]	57
33)	<i>Wells Fargo</i>	[REDACTED]	58
34)	<i>Goldman tells ICAP:</i>	[REDACTED]	59
35)	<i>Barclays has</i>	[REDACTED]	60
36)	<i>Goldman tells ICAP</i>	[REDACTED]	61
37)	<i>Barclays tells ICAP to</i>	[REDACTED]	62
38)	<i>Barclays tells ICAP</i>	[REDACTED]	63
39)	<i>Citigroup senior trader</i>	[REDACTED]	64
40)	<i>Morgan Stanley</i>	[REDACTED]	66
41)	<i>Deutsche Bank warns ICAP</i>	[REDACTED]	68
42)	<i>Barclays tells ICAP</i>	[REDACTED]	69
43)	<i>Barclays tells ICAP</i>	[REDACTED]	70
III.	CONCLUSIONS REGARDING WHETHER THE EVIDENCE IN SECTION II IS CONSISTENT WITH LEGITIMATE HEDGING.....		73
IV.	GENERAL EVIDENCE OF MANIPULATION		77
V.	THE ISDA MASTER AGREEMENT.....		89

QUALIFICATIONS

1. I am the Co-Founder of Blanton Research, a consulting firm specializing in securities trading, valuation, and market practice.

2. From 1985 to 1988, I was employed by Chase Manhattan Bank and Security Pacific Merchant Bank in various accountancy roles. At Chase, my focus was bank auditing. At Security Pacific, I was in the independent valuation group.

3. In 1988, I accepted a position at Bankers Trust Company in New York, where I worked for the following 11 years. I started in the independent valuation group and was tasked with independently valuing proprietary trading positions held by the bank. These positions included positions in FX, bonds, interest rate swaps, and swaptions. I was promoted to junior trader on the USD Funding desk, where I was responsible for issuing and hedging short term debt, utilizing swaps and swaptions. Over the course of 10 years I was promoted to Managing Director and my responsibilities expanded. As Managing Director I oversaw both the asset and liability side of the bank's \$120 billion balance sheet and headed a team of 40 professionals globally. In managing the balance sheet, I utilized an array of interest rate derivative products as hedges, and was an active participant in the swaps and swaptions market, including in the interdealer broker market.

4. In 1999, Bankers Trust was acquired by Deutsche Bank and I accepted a position at Soros Fund Management in New York. At Soros, I traded a global macro strategy that involved trading a wide array of financial products. My primary area of focus was fixed income, and I actively traded Eurodollar futures and options, U.S. Treasury and Agency securities, Foreign Bonds, FX, FX Options, Interest Rate Futures and Options, OTC Vanilla Swaps and Swaptions, and Exotic Options.

5. In 2005, I partnered with several former colleagues and started AFG Advisors, a small boutique hedge fund focusing on global fixed income and volatility strategies. As Chief Investment Officer I was responsible for all trading. The products traded included Eurodollar futures and options, US Treasury and Agency securities, Interest Rate Futures and Options, OTC Vanilla Swaps and Swaptions, and Exotic Options.

6. In 2007, I was hired by Countrywide Capital Markets to oversee their USD derivative desk, government agency desk, and structured products desk in Calabasas California. Countrywide was acquired by Bank of America in early 2008. As desk head, I oversaw trading in Eurodollar futures and options, US Treasury and Agency securities, Interest Rate Futures and Options, OTC Vanilla Swaps and Swaptions, and Exotic Options.

7. In 2009, I joined Morgan Stanley's wealth management division and assisted local brokers to develop fixed income strategies for their clients.

8. In 2011, I was hired as a senior portfolio manager for First NY LLC, a small trading partnership in NYC. I actively traded the global liquid G10 market. The products I traded included Eurodollar futures and options, U.S. Treasury and Agency securities, Foreign Bonds, FX, FX Options, Interest Rate Futures and Options, OTC Vanilla Swaps and Swaptions, and Exotic Options.

9. In 2013, I joined CRT as their Treasurer. CRT was a small growing broker dealer with approximately \$225 million of capital. At CRT I chaired the Asset Liability Committee and oversaw the firm's equity capital allocation and their \$10 billion USD balance sheet, including by engaging in debt hedging. The balance sheet was comprised of US Treasury and Agency securities, Mortgage Backed Securities, Emerging Markets Debt, Corporate Bonds, and Equities.

10. In 2014, I was hired as Managing Director at Tullet Prebon Americas to create a futures division. I hired and managed a team of brokers to develop fixed income and options strategies using futures and options for Tullet Prebon's client base.

11. These positions together, across the thirty-five years of my career, have provided me with three broad qualifications that I have applied in respect of the opinions in this report.

12. *First*, I am versed in industry jargon, trading terminology, and shorthand that are commonly employed by traders and brokers when discussing and executing trades of financial instruments, including swaps, swaptions, and U.S. Treasuries. Throughout many of the positions described above, I traded and worked with other traders and brokers—including ICAP Capital Markets LLC ("ICAP")—and used such jargon on a frequent and regular basis.

13. *Second*, throughout my career I regularly transacted U.S. Treasuries, interest rate swaps, swaptions. I understand the form, function, and purpose of these trades, the methods by which they are traded, and the markets in which they are transacted.

14. *Third*, I have first-hand experience in "hedging" (*i.e.*, transactions entered to offset risks). I have executed numerous derivative trades for the purposes of hedging. I fully understand the concepts and practices of hedging, including hedging risk using swaps and swaptions.

15. My *curriculum vitae* is attached as Appendix A. I am being compensated for time spent on this matter at an hourly rate of \$700. My compensation is not contingent on the outcome of this matter.

SCOPE OF ASSIGNMENT

16. This case involves a set of benchmark rates ("ISDAfix rates") that were set every trading day. Plaintiffs allege that the process by which USD ISDAfix rates were set was manipulated by Defendants to the detriment of Plaintiffs. As an industry expert, I have been

asked by class counsel to offer certain preliminary opinions that I understand are relevant to the issue of class certification.¹

17. *First*, I have been asked to provide background on the market for interest rate derivatives, and the need for and application of USD ISDAfix rates. I have also been asked to describe the “jargon” typically used by those in the interest rate derivatives market.² This background and introduction are set out in Sections A, B and C below.

18. *Second*, I have been asked to describe how USD ISDAfix rates were set. My conclusion is that the USD ISDAfix rate setting process was different in important respects compared to other ISDAfix rate setting process for other currencies. The USD ISDAfix process was the only process handled by an interdealer broker (*i.e.*, an “IDB,” like ICAP), whose business depends on serving the dealers who were trading interest rate products in that market. It was also the only ISDAfix process where the “poll” used to set the ISDAfix rates was preceded by “reference rates” sent to a panel of banks. I understand and have been asked to assume that the USD ISDAfix “reference rate” was routinely “rubberstamped” (*i.e.*, accepted, and returned to ICAP without amendment) by the Dealer Defendants. A description of the USD ISDAfix process is set out in Section D below.

19. *Third*, I have been asked to provide an opinion on whether the unique process for setting of USD ISDAfix rates presented an opportunity for the manipulation by the Dealer Defendants. My conclusion is that it did. The USD ISDAfix rate setting process was prone to

¹ A list of the documents and information I have relied upon in the preparation of this Report is attached as Appendix B.

² As it might assist the Court, I attach as Appendix C a glossary of common financial terms relevant to the subject matter of this case.

manipulation³ because Dealer Defendants could alter their trading strategies through ICAP (including through ICAP's Treasuries-trading platform, "BrokerTec") to influence the rates on Reuters Page 19901 (known as the "19901 Screen"). This, in turn, would achieve the "print" at 11:00 a.m. The 19901 Screen "print" became the source rate used to pre-populate Dealer Defendants' rate submissions, which were rubberstamped and became the final ISDAfix benchmark rates. This opinion is set out in Section I below.

20. *Fourth*, I have been asked to opine regarding whether there is evidence that ICAP and the Dealer Defendants attempted to move the market rates for interest rate swaps and U.S. Treasuries that appeared on Screen 19901, so as to affect the calculation of ISDAfix reference rates, and thus final ISDAfix reference rates. My opinion is that there is evidence of such attempts, and that the process for setting USD ISDAfix rates was frequently abused by ICAP and the Dealer Defendants.

21. The evidence I reviewed in support of this conclusion is largely comprised of recorded telephone conversations, electronic "chats" and messages, and data for Treasuries and swaps trades executed through ICAP. These communications and data frequently show traders at the various Dealer Defendants and the brokers at ICAP *attempting* to affect ISDAfix reference rates. These communications also frequently show ICAP and the Dealer Defendants *acknowledging* that ICAP and the Dealer Defendants were attempting to affect ISDAfix reference rates. In both cases, this evidence shows conduct that is inconsistent with ordinary industry trading practice. It is apparent that Dealer Defendants frequently spent what they described as "ammo" (*i.e.*, funds that could be "wasted" on transactions conducted primarily to move swap rates and swap spreads) in order to get "the print" (*i.e.*, to have rates on ICAP's "screens" where

³ I understand that in some contexts the words "manipulation" or "manipulate" may form part of legal opinions or support legal conclusions. In this report however, I am using those terms only in their general and non-legal sense.

Dealer Defendants wanted them at 11:00 a.m.) in order to move ISDAfix reference rates in a particular direction. These opinions and specific day evidence are set out in Sections II and III.⁴

22. *Fifth*, I have been asked to provide an opinion regarding the *extent* of the evidence showing that the USD ISDAfix rate setting process was manipulated, in particular whether that evidence is limited to isolated transactions, to certain Defendants, or to a period of time shorter than all of the class period. My conclusion is that the evidence of manipulation is not so limited. Instead, the evidence showing that the process for setting USD ISDAfix rates was frequently abused by ICAP and the Dealer Defendants spans a range of transactions, encompasses all Defendants, and is present throughout the class period; it is not limited to isolated incidents or to particular Defendants.

23. For example, there is evidence, more general in nature than the evidence discussed in Section II, which confirms that ICAP and the Dealer Defendants knew that “games” were being played by the other Dealer Defendants around 11:00 a.m., and that often the Dealer Defendants’ primary purpose in trading at that time was “11am print manipulation,” *i.e.*, to move or achieve particular ISDAfix reference rates. As early as August 28, 2008, the Dealer Defendants were talking among themselves about whether to stop manipulating ISDAfix rates. On that date [REDACTED] (Barclays) contacted [REDACTED] (BNPP) with a proposal:

[REDACTED]

⁴ During my review of documents and files from the discovery record in this case, consisting of, collectively, over a thousand chats, messages, and recorded calls, I have identified numerous instances where the conduct described is not consistent with industry custom and practice. In this report, I discuss a only a sample of those chats, messages and recorded calls, thus the samples should be considered illustrative, and not in any way a comprehensive list of Defendants’ attempts at manipulation.

[REDACTED]

[REDACTED]

24. Similarly, when news broke on November 14, 2008 that the New York Attorney General was investigating traders and brokers in the credit default swaps market, [REDACTED] (BNPP)

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]”⁶ These opinions and general evidence are set out in Section IV below.

25. *Finally*, I have been asked whether there is an industry-standard practice in terms of documenting interest rate derivatives transactions. My conclusion is that there is, and I describe for the Court the provisions of the ISDA Master Agreement and related ISDA Definitions that would have been standard across any interest rate derivative transactions entered into with Dealer Defendants. The Dealer Defendants usually acted as Calculation Agents under their ISDA Master Agreements with Plaintiffs and other class members. The Dealer Defendants thus all had an obligation to make various calculations and determinations, including the calculation and determination of Cash Settlement Amounts due under swaptions, in good faith and in a commercially reasonable manner. This opinion is set out in Section V below.

26. My research into the matters discussed in this report is ongoing, and I reserve the right to modify or supplement my opinions as additional information becomes available.

⁵ BNPP_AK_00035048 (emphasis added). From my review of the evidence, it does not appear that any such new deal was ever reached or implemented.

⁶ BARC-IFX_00011635 (emphasis added).

BACKGROUND

A. Derivatives, Benchmarks, and the Need for ISDAfix Rates

27. A derivative is a financial instrument, the value of which depends on the value of some other underlying note or financial instrument, such as interest rates or Treasuries or a stock, bond, currency, or commodity. Derivatives permit market participants to manage and transfer risk by allowing them to separate out and trade individual risk components, such as interest rate risk.

28. The most basic type of interest rate derivative is an interest rate swap. An interest rate swap is a transaction in which the parties calculate interest rate payments on an agreed notional amount for a fixed period of time. Typically, one party will pay based on a “fixed” interest rate on the notional amount, which does not vary from one payment to the next. The other party will pay based on a variable “floating” interest rate that is tied to an independent benchmark such as the London Interbank Offered Rate (“LIBOR”).

29. Swaps are entered into by parties seeking to increase or limit their interest rate risk. For example, a company that believed that interest rates were going to rise might enter a swap where they pay a fixed rate and receive a floating rate over time. This company assumes the risk the floating rate will fall below the fixed rate (because the company is then paying more than it is receiving), but will also receive the profit if the floating rate rises above the fixed rate (because the company is then paying less than it is receiving). Similarly, a company required to pay interest at a floating rate over the life of a loan might enter a swap where they pay a fixed rate and receive a floating rate over the loan period. In exchange for agreeing to pay a fixed rate under the swap, this company has reduced the risk of their increased floating rate payments on the loan, because such increases would be matched by increases in floating rate payments they receive under the swap.

30. Swaps are traded by dealers (often investment banks, like the Dealer Defendants in this case), who trade through brokers (including interdealer brokers, like ICAP, the broker Defendant in this case). During the class period, swaps brokered through ICAP were “voice-traded,” meaning that dealers could not trade swaps on an electronic exchange, where they were implemented by a computer system. They would instead place orders by speaking to a human ICAP broker over the telephone, or by sending messages in a format similar to email, that the ICAP broker would then need to implement manually.

31. Another type of interest rate derivative is the swaption. A swaption is a transaction in which the buyer of the swaption pays the seller a premium for the option, but not the obligation, to enter an interest rate swap contract with the seller on predefined terms on a specified future date. The predefined terms of the underlying swap include the length of time over which payments will be made (*i.e.*, the tenor of the swap), the notional amount, which party will receive the fixed rate while paying the floating rate and vice-versa, the amount of the fixed rate, the calculation of floating payments, the dates on which payments are due, and how often such payments are due. The swaption also specifies the expiration date and when the option may be exercised: for example, European options can be exercised only at the expiration date, while American options can be exercised at any point prior to the expiration date. Additionally, Bermudan swaptions can be exercised at predetermined dates between the purchase date and expiry date.

32. If the swaption is “in the money,” the underlying swap contract is more favorable than the swap contract that the option-holder could obtain in the open market at the time of exercise. For example, if the swaption is a payer swaption, which gives the option-holder the right to pay a pre-specified fixed rate in exchange for receiving floating rate payments, the

swaption is in the money if the pre-specified fixed rate is lower than the fixed rate that could be obtained in the open market for the same tenor. On the other hand, if the swaption is a receiver swaption, giving the option-holder the right to receive the fixed payments in exchange for paying the floating payments, the option is in the money if the pre-specified fixed rate is higher than the fixed rate that could be obtained in the open market at the time of exercise.

33. If the swaption is in the money on the expiration date, the swaption is almost always going to be exercised. If the swaption is out of the money on the expiration date, the swaption is almost never going to be exercised.

34. A physically settled swaption, if exercised, results in the parties entering into an actual swap containing the terms that were agreed upon at the time the swaption was entered. A cash-settled swaption, if exercised, results in the seller of the option making a cash payment to the holder of the option. The amount of the cash payment is intended to represent the net present value of a swap entered into on the agreed upon terms specified in the swaption. The net present value of a swap is determined by comparing the current market rate for an identical tenor swap with the agreed upon rate in the swaption contract, and calculating the present value of that difference over the life of the swap.

35. Settling a cash-settled swaption thus requires a measurement to be taken of what, generally speaking, “the market” is for the pre-negotiated swap. To be more specific, the comparison requires asking what market participants are currently willing to pay on the “fixed” leg of swap that otherwise would have identical terms as the pre-negotiated swap. At one point in time, exercise of a cash-settled swaption required the parties themselves to take a survey of market-makers to come up with this comparison point.⁷

⁷ George Handjinicolaou, ISDA’s Response to the European Commission’s Public Consultation on the Regulation of Indices, at 1-2, 3 (Nov. 29, 2012) (“ISDA developed ISDAFIX to facilitate the

36. The International Swaps and Derivatives Association (“ISDA”) instead developed ISDAfix rates, which were intended to “to increase transparency and price certainty for dealers and end-users in the growing market for privately negotiated derivatives[.]”⁸ ISDAfix rates were established to “provide a par swap curve from independently calculated reference values for cash-settled swap options.”⁹ ISDAfix rates are, in other words, a “benchmark” set of rates that can be used for, among other things, cash settling swaptions.

37. As such, the ISDAfix rate was very important to the resolution of billions of dollars of financial transactions per year.¹⁰ A few basis points’ change in the ISDAfix rate could have large financial consequences for industry participants ranging from the Dealer Defendants themselves to a wide range of clients.¹¹ Industry participants, including the Dealer Defendants here, therefore should have had an incentive to ensure that the ISDAfix rate was fair and accurate.

38. While some ISDAfix rates are no longer currently reported, there have been rates published for the Euro, British Pounds Sterling, the Hong Kong Dollar, Japanese Yen, the Swiss Franc, and the U.S. Dollar. The tenors range from 1 to 30 years. ISDAfix rates were distributed to market participants who subscribe to five electronic screen services operated by Reuters, called ISDAFIX 1 through ISDAFIX 5. For example, ISDAFIX 3 displayed the USD swap rates as well as USD swap spreads, while ISDAFIX 4 displayed the rates for swaps in British Pound Sterling

determination of exercise values for cash-settled swap options. The existence of such a benchmark provides a transparent, readily available value to which parties to a transaction can refer as a settlement rate. Without such a benchmark, it might be necessary to go through the process of calling a number of active dealers for quotes in order to settle transactions.”) *available at* http://ec.europa.eu/finance/consultations/2012/benchmarks/docs/contributions/registered-organisations/isda_en.pdf.

⁸ “ISDA to Introduce Screen Service for Swap Rates and Spreads with Reuters, InterCapital Brokers, and Leading Swaps Dealer,” ISDA (1998), *available at* http://www.isda.org/press/a50398_1.html (announcing the establishment of ISDAfix).

⁹ *Id.*

¹⁰ *See, e.g.,* Deposition of [REDACTED] (Jun. 26, 2017) Ex. 4 at ‘467 [REDACTED]

¹¹ *See, e.g.,* Deposition of [REDACTED] (Jun. 6, 2017) Ex. 10 [REDACTED]

and Swiss Francs. An ISDAfix rate was calculated and published either once or twice a day, depending on the currency.

B. Use of Industry Jargon, Generally

39. As mentioned above, swaps brokered by ICAP during the class period were brokered through a “voice” system. Traders and ICAP brokers thus frequently communicated over the phone, or by way of electronic messages.

40. It was also common for traders and brokers to communicate regarding more than just which trades a trader wanted a broker to place. Brokers and traders can spend hours talking with each other, and brokers sometimes serve as the eyes and ears for their trader clients, providing information as to what is occurring in the market and why—market “color.” Brokers are incentivized to develop relationships with dealer. For example, how much a broker receives in commissions is driven by whether—and how often—a dealer decides to trade with them. Traders and brokers also socialize outside of work, as brokers attempt to gain favor with dealers to ensure that the dealer trading flow came their way, and dealers hope to discover order flow information from the brokers.¹² Traders and brokers thus often develop strong personal relationships, and their discussions mix personal and business matters.

41. Like in many professions, traders and brokers of interest rate derivatives often communicate in market jargon. Take a simple derivative: a “vanilla” interest rate swap, which is a contract where each side may make payments to the other. A layperson might want to refer to a transaction as having a “buyer” and a “seller,” but in a contract with payment obligations on both parties there is no obvious meaning to those terms. By industry convention, to “buy” a vanilla

¹² See, e.g., Deposition of [REDACTED] (Jun. 15, 2017), Tr. 126:23-127:9 [REDACTED]
[REDACTED]

swap is to agree to pay (*i.e.*, to become the “payer” of) the fixed rate of interest while receiving the floating rate of interest. To “sell” a vanilla swap is to agree to receive (*i.e.*, to become the “receiver” of) the fixed rate of interest while committing to paying the floating rate of interest.

42. A layperson might also ask what the “price” of an instrument is. For interest rate swaps, the “price” of the swap is likely to be the “swap rate,” *i.e.*, the fixed rate payable by the buyer of the swap. The negotiation between the potential buyer and potential seller of a swap thus occurs over whether this swap rate is higher or lower, in the same way that a buyer and a seller might haggle over “price.”

43. Nor is it likely to be clear to the layperson what the fixed rate of interest will be applied to, and what the floating rate of interest will be applied to, because unlike a loan there is no “debt” or “principal” in the traditional sense. The figure to which the two interest rates will be applied in order to calculate the exact cash flows is called the “notional” amount. The notional amount describes the size of the swap that the parties want to enter. It is standard market convention that a unit of notional amount is one million U.S. Dollars. Thus, when traders refer to “buy \$100,” they mean the interest payments will be calculated on a \$100,000,000 figure. It does not mean the “buyer” must pay \$100,000,000 up-front, like it would if it were buying a \$100,000,000 bond.

44. “Swap spreads” are also actively traded. A swap spread is the additional yield quoted in basis points ($1/100^{\text{th}}$ of a percent) that the payer or receiver requires as an additional spread over a risk-free rate. In the U.S. market, the standard risk-free rate is the rate on the applicable tenor of a U.S. Treasury security. A swap spread trade consists of a swap transaction and a U.S. Treasury security transaction. A buyer of a swap spread pays a fixed rate on a swap and simultaneously purchases a U.S. Treasury security from the swap counterparty. The

negotiated spread is added to the rate of the U.S. Treasury and becomes the fixed rate of the swap. For example, if a five-year swap spread is 25 basis points, and the yield on a U.S. Treasury security is 2%, the five-year swap contract rate is 2.25%.

45. The following February 10, 2012 discussion between [REDACTED] (a Barclays Trader) and [REDACTED] (a ICAP broker) illustrates trader jargon:¹³

[REDACTED]

46. The expression [REDACTED],
i.e., stating an intent to accept a (previously stated) offer to buy. This means Goldman would be *receiving* payments linked to the fixed rate, while *making* payment linked to LIBOR. The expression [REDACTED]
 [REDACTED]. The expression [REDACTED]
 [REDACTED] is jargon for the swap rate or swap spread rate being discussed. The full rate being discussed is unlikely to be “8%,” for a few reasons. First, often traders talk not in terms of the final full interest rate, but instead in terms of the difference between the rate being discussed and current Treasury yields. Second, it is industry practice to shorten discussions by referring to the fractions or the last numeral in a string of numbers. Anyone conversant in the market and trading at that time, who heard a reference to [REDACTED] would know the rest of the number surrounding the [REDACTED]

47. The expression [REDACTED]
 [REDACTED]. Again however, the rate is not just .75% [REDACTED].

¹³ BARC-IFX-C_00001196.

Anyone trading at that time, and hearing a reference to [REDACTED] would know that what was being referred to was a swap spread of “7.75.” The expression [REDACTED] means that Barclays is now willing to buy two year tenor swaps [REDACTED] The reference to [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED] The statement [REDACTED] [REDACTED]

[REDACTED].

48. This is just one example of how even the simplest of transactions—Barclays trying to buy a swap—can result in communications that would be difficult for a layperson to understand. Below, I go through a sample of the trader chats and messages in this case in an effort to make the jargon used by the Dealer Defendants and ICAP understandable to the Court.

C. “Timestamps” on Swaps and Treasury Trades Brokered by ICAP

49. While USD ISDAfix reference rates were calculated from Treasury yields and swap spreads as displayed on Screen 19901 at 11:00 a.m., it is important to note that Plaintiffs in this case have not been able to precisely identify the time at which interest rate swap or swap spread transactions were entered. Swaps were executed through ICAP using “voice” trading, meaning that broker would execute a swap after receiving instructions from a trader over the phone or through electronic messages. However, the record of that transaction would then need to be entered manually by a broker’s assistant into ICAP’s system and to Swapswire (now known as MarkitSERV).¹⁴

¹⁴ SwapWire allows banks to capture and confirm interest rate and credit derivative trades directly. Inter-dealer brokers can send broker confirmations electronically to dealers using the same system and format, meaning deals are captured, confirmed with the broker, and confirmed with the counterparty as part of a single smooth automated process. Swapswire was acquired by MarkitSERV in early 2008.

50. Thus, ICAP has confirmed that the timestamps for ICAP-brokered swaps trades are not necessarily the exact time that the trades were executed, and instead that it was common for a trade ticket to be timestamped many minutes after the actual trade time.¹⁵ I understand that this lag time could be significant on busy days.

51. This degree of lag time was not present for rates that were displayed on the 19901 Screen, a display which was also known as “the print”. These rates were also entered manually, by an ICAP employee—known as a “pecker” or a “screen guy”—who sat with the ICAP brokers, listened to the bids, offers and executed transactions, and then “pecked” the results into a terminal controlling the 19901 Screens.¹⁶ However, this process was supposed to occur more or less in real time, and thus the lag was much shorter, and should typically have been limited to a matter of seconds.

52. Similarly, I understand that timestamps for Treasuries trades executed through ICAP’s “BrokerTec” system are highly accurate because they were recorded automatically by that system, and reflect the exact time when executable bids and offers and trades occurred, rather than some subsequent point in time when they were manually “entered” into the system.

D. The Process for ISDAfix Rates

53. Generally speaking, the setting of all ISDAfix rates (both USD, and other) began with the same basic concept: A “poll” of rates and spreads was taken of a given “panel” of dealers. According to ISDA, the rate provided by a dealer was supposed to be “the mean of where that dealer *would itself* offer and bid a swap in the relevant maturity for a notional

¹⁵ See ICAP 30(b)(6) Deposition (Jun. 12, 2017), Tr. 348 :14- [REDACTED]

¹⁶ See e.g., *Id.*, Tr. 67:16-23 [REDACTED]

equivalent amount of US \$50 million or whatever amount is deemed market size in that currency for that tenor to an acknowledged dealer of good credit in the swap market.”¹⁷ ISDA specified that the “rate [provided by a dealer in response to a poll] *should not be where the dealer sees mid-market away from itself, but should be the function of its own bid/offer spread.*”¹⁸

54. The top and bottom rates received from dealers in response to this poll were generally discarded (a process known as “topping and tailing”), with the exact number of discards varying depending on, for instance, the number of responses received for that currency/tenor. The remaining submissions were averaged to come up with a final, published rate and spread (discussed below) for a particular currency/tenor pair. For all currencies except USD, this process of conducting a poll, receiving responses, calculating a trimmed average, and generally administering the day-to-day activities was carried out by Thomson Reuters, the information and technology company. Thomson Reuters acted completely independent of the Dealer Defendants in carrying out this function for the non USD ISDAfix rates.

55. For USD ISDAfix rates, however, Thomson Reuters did not control the submission process. Instead, the process of administering USD ISDAfix rates was given to Defendant ICAP. ICAP is, among other things, an interdealer broker for interest rate swaps. This means that ICAP—unlike Thomson Reuters—was generating revenue by brokering swaps and other interest rate derivatives between dealers while also administering an interest rate benchmark.

56. Unlike the process followed by Thomson Reuters when calculating ISDAfix rates for other currencies, USD ISDAfix rates during the Class Period were calculated by ICAP first

¹⁷ ISDA, *How does ISDAFIX fix? , Rate Definition*, <https://web.archive.org/web/20120630173533/http://www2.isda.org/asset-classes/interest-ratesderivatives/isdafix>.

¹⁸ *Id.* (emphasis added).

distributing to the panel banks a “reference rate” for each tenor of interest rate swaps.¹⁹ In practice, this meant that instead of the panel banks logging on to the polling website and seeing a blank, they would see a “prepopulated” set of figures provided by ICAP.²⁰ While panel banks were able to overwrite the prepopulated “reference rates” on the polling webpage, they were also able simply to submit (*i.e.*, rubberstamp) those same prepopulated rates.²¹ The responses received during the polling window were used to calculate USD ISDAfix rates, regardless of whether the panel banks merely accepted the reference rates, or entered alternative figures.

57. I understand Dr. Williams has conducted an analysis of the USD ISDAfix reference rates, poll responses, and final rates.²² I also understand he has concluded that the panel banks during the Class Period almost always “rubberstamped” the reference rates, *i.e.*, all or nearly all Dealer Defendants responded to the “poll” by adopting the “reference rates” provided by ICAP, day in and day out, for years. I have been asked to assume that the Dealer Defendants and ICAP were aware this was taking place.

¹⁹ See, e.g., Order, *In the Matter of The Goldman Sachs Group, Inc. and Goldman, Sachs & Co.* (the “GS CFTC Order”), CFTC Dkt. 17-03, at 5 (Dec. 21, 2016) (“[T]o set USD ISDAfix rates for the 2-year through 30-year maturities, [ICAP] first generated reference rates and spreads from the snapshot of 11:00 a.m. 19901 screen prices, reflecting either the last traded spread or the mid-point between the most recent executable bid and offer.”).

²⁰ See, e.g., GS-ISDAFIX-CIVIL-00017255 [REDACTED]

²¹ Deposition of [REDACTED] (Jun. 5, 2017), Tr. 47:1-5 [REDACTED]

²² See also generally, e.g., ICM-000214848 [REDACTED]

OPINION

I. THE USD ISDAFIX REFERENCE RATE PROCESS, AND DEFENDANTS' RUBBERSTAMPING PRACTICE, CREATED AN OPPORTUNITY FOR MANIPULATION

58. **How reference rates were calculated.** As summarized above, the process for calculating final USD ISDAfix rates was unique because it was based on ISDAfix reference rates circulated by ICAP to the Dealer Defendants shortly after 11:00 a.m., which were in turn determined by ICAP using rates displayed on the 19901 Screen at 11:00 a.m.²³

59. However, because Dealer Defendants could trade in the market whose rates were displayed on the 19901 Screen, they could thus affect ISDAfix reference rates, and thus also affect final ISDAfix rates. This system created an opportunity for Defendants to manipulate the ISDAfix rate setting process in at least two different ways. To explain these two ways, I will first explain the relation between interest rate swaps and U.S. Treasuries.

60. As previously discussed, the U.S. Treasuries yield (*i.e.*, the annual return to the holder of a U.S. Treasury expressed as a percentage of the purchase price) is considered a proxy for a theoretical “risk free” interest rate (*i.e.*, the theoretical rate of return on an investment with no credit risk).

61. Accordingly, as the “risk free” rate goes up or down, one can expect private parties (who are typically not considered “risk free”) to charge each other more or less as well. This relation means that the fixed interest rate paid in a private transaction can, and often is, expressed in terms of its “spread” over the yield currently payable by U.S. Treasuries of the same tenor. Thus, when traders discuss the fixed rate on a vanilla swap, they often do not quote a specific percent (*e.g.*, “4.8125%”). Rather, they discuss the current “spread,” as measured in “basis points”

²³ As also summarized above, I have been asked to assume that the banks almost always “rubberstamped” the reference rates, and thus that the ISDAfix reference rates circulated by ICAP shortly after 11:00 a.m. on a given day almost always became the final ISDAfix rates for that day.

(1/100th of a percent), between that fixed rate and the U.S. Treasury yield for the same tenor (*e.g.*, “56 and 1/4,” which would equal a swap rate of 4.8125% if the U.S. Treasury yield at that time was 4.25%).

62. ICAP’s “reference rate” calculation process worked in a similar way. To determine the “fixed rate” on a swap, ICAP would take the Treasury yield for a given tenor at 11:00 a.m., and then add the market swap spread, *i.e.*, the amount of yield that interest rate swap market participants were charging each other on top of the U.S. Treasuries yield at that time.

63. ICAP would determine the relevant Treasuries yield by reference to executed trades and executable bids and offer data at 11:00 a.m. on ICAP’s electronic Treasuries trading platform “BrokerTec.” ICAP would then pull the “swap spread” rate from the 19901 Screen at 11:00 a.m., which reflected the most recent swap spreads observed from completed trades and executable bids and offers in market size that were brokered through ICAP.

64. The following is an example of how the 19901 Screen would look:²⁴

07/17	15:12 NYC	[REUTERS CAPITAL MKTS SOURCE ICAP/BTEC]				07/17	15:11 19901
TERM	TREASURY	YIELD	M-YIELD	SWAP-SPREAD	SEMI-BOND	ANN-MONEY	
[2YR	100.00+-01	5.115-106	5.110	49.00-45.00	5.600-560	5.593-553]	
[3YR	99.156-16	5.067-064	5.066	51.50-47.50	5.581-541	5.575-535]	
4YR			5.050	54.25-50.25	5.593-553	5.589-549	
[5YR	100.122-12+	5.036-034	5.035	58.00-54.00	5.615-575	5.612-572]	
6YR			5.041	59.00-55.00	5.631-591	5.627-587	
7YR			5.047	60.00-56.00	5.647-607	5.643-604	
8YR			5.054	61.00-57.00	5.664-624	5.660-620	
9YR			5.060	61.75-57.75	5.677-637	5.675-635	
[10YR	100.14 -14+	5.067-065	5.066	62.50-58.50	5.691-651	5.687-648]	
12YR			5.066	65.00-61.00	5.716-676	5.713-673	
15YR			5.075	67.00-63.00	5.745-705	5.743-703	
20YR			5.084	68.00-64.00	5.764-724	5.762-722	
25YR			5.093	66.75-62.75	5.760-720	5.759-719	
[30YR	90.27 -27+	5.103-102	5.102	65.00-61.00	5.753-713	5.750-710]	
12Y MID-YIELDS USE 10Y MID-YIELDS, ALL OTHERS (EXCEPT ON-THE-RUN) ARE INTERPOLATED							
[BBA LIBOR 1M]		5.37000	[3M]	5.49000	[6M]	5.56000	[12M] 5.62813

²⁴ BNPP_AK_00098715. The “tenor” of the swap is displayed under the heading “Term” in column one. The Treasury rate is displayed under “Treasury” in column two. The Treasury yield is displayed under “Yield” and “M-Yield” in columns three and four. The swap spread is displayed under “Swap – Spread” in column five.

65. As previously discussed, adding ICAP's Treasuries yield to ICAP's swap spread results in a swap "rate" for the fixed leg of a fixed-for-LIBOR vanilla swap. It was this combined sum that made up the ISDAfix "reference rate" for a given tenor of swap (together with the underlying swap spread) and was circulated to the Dealer Defendants for them to accept, or modify, and then to return to ICAP.

66. There were thus at least two opportunities for Dealer Defendants to impact the reference rates: (1) engage in U.S. Treasuries buying and selling activity (impacting the baseline Treasuries yield drawn from ICAP's BrokerTec platform), or (2) engage in swaps buying and selling activity through ICAP (impacting the swap rate or swap spread drawn from the 19901 Screen).

67. ***The distinction between "buying" and "selling" on rates versus yield.*** It is important to recognize the distinction between buying and selling on rates versus buying and selling on yields. One who purchases a debt instrument with a fixed rate will benefit if yields drop, because the price of their security will rise in value as their contractual fixed rate is worth more than the current market yield. In contrast, in swaps transactions, buyers of swap spreads pay a fixed rate and will economically benefit if rates increase.

68. Accordingly, to move the BrokerTec component of a reference rate (*i.e.*, the Treasuries yield) *up* for a given tenor, one could put *selling* pressure on Treasuries of that same tenor, by offering to accept lower and lower prices from purchasers, and thus produce higher yields. To move the BrokerTec component of the ISDAfix reference rate *down*, one could put *buying* pressure on Treasuries, by offering to pay higher and higher prices to buyers of the Treasuries, which would thus produce lower yields.

II. EVIDENCE OF MANIPULATION ON SPECIFIC DAYS

1) UBS and RBS play [REDACTED]

69. On May 10, 2006, shortly after 11:00 a.m., [REDACTED] (an ICAP broker) emailed [REDACTED] (all traders at Merrill Lynch) reporting that [REDACTED]²⁵

70. [REDACTED] in this context refers to the 19901 Screen, which—as described above—is used to set ISDAfix reference rates at 11:00 a.m. The reference to [REDACTED] is a reference to the 10 year tenor of interest rate swaps. The reference to [REDACTED] is a reference to [REDACTED]. Thus, when ICAP's language is deciphered, it reveals [REDACTED]

71. ICAP's trading data show that on May 10, 2006, UBS sold [REDACTED] in notional in 10 year swaps.²⁶ UBS's transactions would have had the effect of pushing down the rate for 10 year swaps. ICAP's trading data show that on May 10, 2006, RBS bought [REDACTED] in notional in 10 year swaps.²⁷ ICAP's trading data also show that between 10:59 and 11:00 a.m. on this day, RBS sold a net amount of [REDACTED] notional in 10 year tenor Treasuries. RBS's transactions would have had the effect of pushing the rate for 10 year swaps higher.

2) Barclays and ICAP [REDACTED]

72. On July 26, 2006, two Barclays traders admitted to [REDACTED] (at ICAP) that Barclays [REDACTED]. In response, [REDACTED] asked [REDACTED]. [REDACTED] One of the traders responded that

²⁵ ICM-001514434.

²⁶ These transactions are timestamped 11:17 a.m., 11:23 a.m., and 11:24 a.m.

²⁷ This transaction is timestamped 11:23 a.m.

he did [REDACTED]²⁸ Closer to 11:00 a.m., [REDACTED] discussed with the broker when to [REDACTED] versus when to [REDACTED]²⁹

73. ICAP's trading data show that on July 26, 2006, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.³⁰ This transaction would have had the effect of pushing down the rates for 10 year swaps.

3) Barclays tells ICAP:

74. At 10:54 a.m. on January 4, 2007, [REDACTED] (of Barclays) had the following exchange with [REDACTED] (at ICAP):³¹

Group	Should take action	Should not take action
All respondents	85%	15%
Male	83%	17%
Female	87%	13%
18-29	92%	8%
30-49	88%	12%
50-69	85%	15%
70+	78%	22%

75. The reference to the trades being [REDACTED] indicates that [REDACTED] was

[REDACTED]. The references to [REDACTED]
[REDACTED] are ICAP asking [REDACTED]
[REDACTED] and to

²⁸ BARC-IFX_00075846; BARC-IFX-C_00000329 (emphasis added).

²⁹ BARC-IFX-C_00000330 (emphasis added).

³⁰ This transaction is timestamped 11:19 a.m.

³¹ ICM-001460607, ICM-001460608 (emphasis added).

[REDACTED]

[REDACTED] is Barclays' confirmation that [REDACTED]

[REDACTED].

76. At 10:59 a.m., after being informed someone was [REDACTED]

[REDACTED] Someone again [REDACTED] in response to which [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] He then broke to say [REDACTED]

[REDACTED]³²

77. ICAP's trading data show that on January 4, 2007, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.³³ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, Barclays bought a net total of [REDACTED] of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 10 year swaps.

4) *Goldman tells ICAP* [REDACTED]

78. On January 19, 2007, the Goldman Options Desk had certain client-facing interest rate products that priced based on the differences between 10 year and 30 year ISDAfix rates.³⁴

At 10:59 a.m., a Goldman trader called [REDACTED] (of ICAP), [REDACTED]

[REDACTED]

79. The reference to [REDACTED] is a reference to the rate for interest rate swaps in the 10 year tenor. The reference to [REDACTED] is a reference to the rate for interest rate swaps in the 30

³² ICM-001460612.

³³ These transactions are timestamped between 11:40 a.m. and 11:43 a.m.

³⁴ See the GS CFTC Order, at 12 (Dec. 21, 2016).

year tenor.³⁵ [REDACTED] would similarly be shorthand for a spread. The two references to [REDACTED] show that [REDACTED]

[REDACTED]

11.00 a.m., *i.e.*, at the time that [REDACTED] reference rates were calculated.

80. ICAP's trading data show that on January 19, 2007, Goldman purchased [REDACTED] in notional in 30 year swaps around 11:00 a.m.³⁶ This transaction would have had the effect of pushing up the rates for 30 year swaps.

5) *Goldman tells ICAP broker:* [REDACTED]

81. On January 30, 2007, [REDACTED] (of Goldman Sachs) and [REDACTED] (of ICAP) had the following exchange, beginning around 10:49 a.m.³⁷

[REDACTED]

[REDACTED]

[REDACTED]

³⁵ ICM-001465897. The term "bonds" is always used to refer to the 30 year tenor. However, determining whether the 30 year tenor is in swaps or U.S. Treasuries requires looking at the context. Here, [REDACTED]

³⁶ This transaction is timestamped 11:09 a.m.

³⁷ ICM-001465990 (emphasis added).

[REDACTED]

82. As discussed above, it is consistent with industry practice to refer to the data in ICAP's systems and displayed on the 19901 Screen as the "print." [REDACTED] testified that by hitting the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

83. The broker asks [REDACTED]. He is thus asking the trader [REDACTED]

[REDACTED]

84. The trader repeatedly pushes back on [REDACTED]

[REDACTED]

³⁸ See Deposition of Nicholas Farr (Jan. 27, 2017), Tr. 226:2-5.

[REDACTED]

[REDACTED]

[REDACTED]. However, the trader believes that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

85. As discussed above, ICAP's "screens" are updated manually by a person who enters transaction rates into ICAP's systems (known as the "screen guy"). [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. He is concerned only with [REDACTED]

[REDACTED] ³⁹

86. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] ⁴²

87. In the phone call discussed above, [REDACTED]

[REDACTED]

[REDACTED]

³⁹ *Id.* Tr. 190:19-191:5.

⁴⁰ GS-ISDAFIX-CIVIL-00044591; ICM-000021291; ICM-000021294 (emphasis added).

⁴¹ See Deposition of [REDACTED] (Jan. 27, 2017), Tr. 218:25-219:2.

⁴² ICM-001511388 (emphasis added).

[REDACTED]

88. ICAP's trading data show that on January 30, 2007, Goldman sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁴³ This transaction would have had the effect of pushing down rates for 10 year swaps.

6) *RBS tells ICAP it wants to* [REDACTED]

89. On January 30, 2007, just before 11:00 a.m., an RBS trader told [REDACTED] (of ICAP) that [REDACTED] and asked if this would be [REDACTED] [REDACTED] replied saying that the question is [REDACTED]

[REDACTED] and asking '[REDACTED]

[REDACTED] The RBS trader responded [REDACTED]

[REDACTED]⁴⁴

90. [REDACTED] refers to the fact that ICAP [REDACTED]

[REDACTED] Thus, the trader is [REDACTED]

[REDACTED]⁴⁵

[REDACTED] and the RBS trader then discussed [REDACTED]

telling [REDACTED] exactly when to trade with the instruction [REDACTED]

⁴³ This transaction is timestamped 10:57 a.m.

⁴⁴ ICM-001466389 (emphasis added).

⁴⁵ ICM-001466936.

then in turn yells out to other brokers at ICAP [REDACTED]

[REDACTED].⁴⁶

91. ICAP's trading data show that on January 30, 2007, RBS sold [REDACTED] notional 2 year swaps,⁴⁷ and Barclays sold [REDACTED] notional in 2 year swaps,⁴⁸ around 11:00 a.m. ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, RBS bought just over a net amount of [REDACTED] in notional of 2 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 2 year swaps.

7) *Barclays tells ICAP* [REDACTED]

92. On March 14, 2007, around 10:53 a.m., [REDACTED] (of Barclays) called an ICAP broker. The ICAP broker asked [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]⁵⁰

93. The reference to [REDACTED] is a reference to [REDACTED]
[REDACTED]. The reference to not [REDACTED], and to [REDACTED]
[REDACTED] are references to [REDACTED]
[REDACTED] The reference to [REDACTED] indicates that Barclays was [REDACTED]
[REDACTED]

⁴⁶ ICM-001466389.

⁴⁷ The transaction is timestamped 11:04 a.m.

⁴⁸ The transaction is timestamped 11:07 a.m.

⁴⁹ The broker's statement [REDACTED]
[REDACTED]
[REDACTED]

⁵⁰ BARC-IFX-C_00000311 (emphasis added).

94. ICAP's trading data show that on March 14, 2007, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁵¹ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, Barclays bought net [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 10 year swaps.

8) *JPMorgan* [REDACTED]

95. On May 9, 2007, [REDACTED] (a trader at Lehman Brothers, and later Nomura) told [REDACTED] (of ICAP) around 10:56 a.m. that [REDACTED]

[REDACTED]⁵²

96. It is common in the industry to refer to tenors in shorthand, *i.e.*, [REDACTED] can refer to an instrument with a ten year tenor. However, there is no such thing as an 11 year tenor in this context. The reference to [REDACTED] is thus a reference [REDACTED] Chase was [REDACTED], *i.e.*, when ISDAfix reference rates were calculated.

97. The chat then went silent until 11:01 a.m., *i.e.*, after ISDAfix reference rates were calculated. Then it continued:⁵³

[REDACTED]

[REDACTED]

[REDACTED]

⁵¹ These transactions are timestamped 11:12 a.m. and 11:14 a.m.

⁵² ICM-000204575 (emphasis added).

⁵³ *Id.* (emphasis added).

98. The word [REDACTED] here, as noted, refers to [REDACTED]
 [REDACTED] [REDACTED] [REDACTED] Thus, [REDACTED]
 [REDACTED] refers to JPMorgan indicating [REDACTED]
 [REDACTED]. This indication had [REDACTED] (an ICAP broker who dealt extensively
 with JPMorgan) [REDACTED] *i.e.*, that he believed that [REDACTED]
 [REDACTED].

99. The conversation indicates it is considered basic knowledge [REDACTED]
 [REDACTED] that because [REDACTED] [REDACTED] [REDACTED]
 [REDACTED] [REDACTED] [REDACTED]
 [REDACTED] [REDACTED] [REDACTED] [REDACTED]
 [REDACTED] [REDACTED]

100. ICAP's trading data show that on May 9, 2007, JPMorgan sold [REDACTED] in
 notional in 10 year swaps around 11:00 a.m.⁵⁴ ICAP's trading data also show that, between 10:59
 and 11:00 a.m. on that day, JPMorgan bought a net amount of [REDACTED] in notional of 10 year
 Treasuries. Combined, these transactions would have had the effect of pushing down the rates for
 10 year swaps.

9) Deutsche Bank [REDACTED]

101. On May 21, 2007, [REDACTED], an ICAP broker, told various Merrill Lynch
 traders that Deutsche Bank was engaging in [REDACTED]
 [REDACTED]

102. The reference to [REDACTED] indicated that ICAP believed that Deutsche was
 [REDACTED]. The reference to Deutsche

⁵⁴ These transactions are timestamped between 11:05 a.m. and 11:42 a.m.

Bank have [REDACTED] RBS and Lehman indicates that [REDACTED]

[REDACTED].⁵⁵

103. ICAP's trading data show that on May 21, 2007, Deutsche sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁵⁶ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Deutsche bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 10 year swaps.

10) *RBS and ICAP* [REDACTED]

104. On June 13, 2007, [REDACTED] (of ICAP) messaged [REDACTED] (also of ICAP) around 10:37 a.m., stating: [REDACTED]⁵⁷

Thompson replied: [REDACTED]⁵⁸

105. That same morning, [REDACTED], a RBS trader, spoke with several other RBS traders to discuss [REDACTED]. One RBS trader on the call declared, [REDACTED]

[REDACTED]

[REDACTED], [REDACTED], [REDACTED]

[REDACTED]

[REDACTED],

[REDACTED]

[REDACTED]

106. Later, [REDACTED] stated h [REDACTED]:

[REDACTED]

⁵⁵ ICM-000031390.

⁵⁶ These transactions are timestamped 10:57 a.m., 11:10 a.m., 11:34 a.m., and 11:41 a.m.

⁵⁷ ICM-000726650.

⁵⁸ ICM-001008517.

[REDACTED] This conversation continued, in similar terms, with the RBS traders agreeing that: [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] One of the RBS traders participating in this call even noted that [REDACTED]

[REDACTED]⁵⁹

107. That ICAP was told [REDACTED]

[REDACTED] As discussed above, ICAP's screens are updated manually, and thus

[REDACTED]

[REDACTED]

108. The reference to [REDACTED] shows that RBS and ICAP had agreed to

[REDACTED] The reference to the fact that the trading [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] further shows that this activity was intended to affect swap rates immediately before 11:00 a.m.

109. Each of these statements, and especially the combination of them when viewed as a whole, shows clearly that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

⁵⁹ RBS-Alaska-ISDA-AUD-000021118 (emphasis added).

110. RBS communications show that the RBS traders began planning the June 13 activity as early as the day before. In communications on June 12, 2007, RBS traders planned, discussed, and agreed what they would do the next day:⁶⁰

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

- [REDACTED]

111. These statements and admissions again demonstrate that RBS was attempting to move rates on 19901 Screen in order to influence ISDAfix rates. The expressions [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]. The statements about [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]. The references to [REDACTED]

[REDACTED]

⁶⁰ RBS-Alaska-ISDA-AUD-000020898; RBS-Alaska-ISDA-AUD-000020934. These discussions between the RBS traders continued along similar lines for several more minutes. I list only a sample of the language used here.

ISDAfix reference rates were calculated at 11:00 a.m.

112. ICAP's trading data show that on June 13, 2007, RBS engaged in multiple swap purchase transactions in the 15 year (██████████ in notional), 20 year (██████████ in notional), 25 year (██████████ in notional), and 30 year swap tenors (██████████ in notional).⁶¹ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, RBS sold a net amount of ██████████ in notional of 10 year Treasuries, and a net amount of ██████████ in notional of 30 year Treasuries. Combined, these transactions would have had the effect of pushing up rates for 15, 20, 25 and 30 year swaps.

11) *Barclays tells ICAP* ██████████

113. At 10:50 a.m. on June 25, 2007, ██████████ (Barclays) called ██████████ (ICAP), and asked ██████████. ██████████ replied, ██████████. In response, over the next ten minutes leading up to 11:00 a.m., ██████████ variously directed ██████████, ██████████,⁶² ██████████, ██████████,⁶³ ██████████; and ██████████ confirmed these instructions, telling ██████████ then informed ██████████, "to which ██████████ responded: ██████████. ██████████ instructions continued though to 10:58:07 am, when he demanded, ██████████. ██████████ responded, ██████████.

⁶¹ These transactions are timestamped between 10:53 a.m. and 11:50 a.m.

⁶² BARC-IFX_00082905; BARC-IFX_00011820 (emphasis added).

⁶³ BARC-IFX_00082906 (emphasis added).

At 11:00 a.m., asked [REDACTED] replied [REDACTED]⁶⁴

114. In this context, [REDACTED] referred to 5-year swap rates. [REDACTED] reference to [REDACTED]. The references to [REDACTED] being able to [REDACTED] meant that [REDACTED] references to [REDACTED] shortly before 11 a.m., plus [REDACTED] reference to the trades being [REDACTED] demonstrate that Barclays and ICAP were [REDACTED].

115. An email from [REDACTED] (Barclays options desk) to [REDACTED] (a trader on Barclays' U.S. Treasuries desk) confirms that the purpose of these Treasuries trades was [REDACTED] d [REDACTED]. [REDACTED] [REDACTED] [REDACTED] [REDACTED]⁶⁵ At around 10:55 a.m., [REDACTED] sought confirmation that [REDACTED] wanted him to [REDACTED] replied [REDACTED]⁶⁶

⁶⁴ See Order, *In the Matter of Barclays PLC, Barclays Bank PLC, and Barclays Capital Inc.*, CFTC Dkt. No. 15-25, at 11 (May 20, 2015), <http://www.cftc.gov/idx/groups/public/@lrenforcementactions/documents/legalpleading/enfbarclaysorder052015.pdf>; BARC-IFX_00082906.

⁶⁵ See Order, *In the Matter of Barclays PLC, Barclays Bank PLC, and Barclays Capital Inc.*, CFTC Dkt. No. 15-25, at 11 (May 20, 2015) (emphasis added), <http://www.cftc.gov/idx/groups/public/@lrenforcementactions/documents/legalpleading/enfbarclaysorder052015.pdf>.

⁶⁶ BARC-IFX_00007491.

116. ICAP's trading data show that June 25, 2007, Barclays [REDACTED] in notional in 5 year swaps around 11:00 a.m.⁶⁷ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, Barclays sold a net amount of [REDACTED] in notional of 5 year Treasuries. Combined, these transactions would have had the effect of pushing up the rate of 5 year swaps.

12) ICAP [REDACTED]
[REDACTED]

117. On July 9, 2007, around 11:23 a.m., [REDACTED] (of ICAP) and [REDACTED] (of Goldman) had the following exchange:⁶⁸

[REDACTED]	[REDACTED]
	[REDACTED]
	[REDACTED]
[REDACTED]	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
[REDACTED]	[REDACTED]
	[REDACTED]
	[REDACTED]

118. Here, ICAP is [REDACTED]

[REDACTED]

119. The trader complained, however, that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Relatedly, [REDACTED] refers to the fact that ICAP

[REDACTED]

[REDACTED] In short, the Goldman trader [REDACTED]

⁶⁷ These transactions are timestamped between 11:16 a.m. and 11:18 a.m.

⁶⁸ GS-ISDAFIX-CIVIL-00244217 (emphasis added).

120. ICAP's trading data show that on July 9, 2007, Goldman sold [REDACTED] in notional in 30 year swaps around 11:00 a.m.⁶⁹ These transactions would have had the effect of pushing down the rates for 30 year swaps.

13) Barclays tells ICAP broker:

121. On July 30, 2007, [REDACTED] (of Barclays) and [REDACTED] (of ICAP) had the following exchange, beginning around 10:54 a.m.:⁷⁰

122. The fact the trader initially asked [REDACTED]
[REDACTED] is suspicious. Even more telling is the fact that the trader refers

⁶⁹ These transactions are timestamped between 11:20 a.m. and 11:37 a.m.

⁷⁰ BARC-IFX-C 00001190 (emphasis added).

to making sure [REDACTED] The [REDACTED] is,
again, [REDACTED]

[REDACTED]

[REDACTED]

123. The recording is then silent for a while, before [REDACTED] (Barclays) urgently instructs:⁷¹

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]

124. The urgency of the timing again indicates the purposes of these trades centers around 11:00 a.m., *i.e.*, when ISDAfix reference rates are set. The fact the instruction is focused

[REDACTED]

[REDACTED]

[REDACTED]

125. As 11:00 a.m. approaches, [REDACTED] again instructs: [REDACTED]

[REDACTED] asks [REDACTED] and [REDACTED] explains that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] he asks: [REDACTED]

⁷¹ *Id.* (emphasis added).

126. ICAP's trading data show that July 30, 2007, Barclays sold [REDACTED] in notional in 2 year swaps around 11:00 a.m.⁷² ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, Barclays bought a net amount of [REDACTED] in notional of 2 year Treasuries. Combined, these transactions would have had the effect of pushing down rates for 2 year swaps.

14) *Barclays trader tells ICAP:* [REDACTED]

127. On October 5, 2007, around 10:56 a.m., [REDACTED] (of Barclays) told [REDACTED] (of ICAP): [REDACTED] [REDACTED] later confirmed, [REDACTED] He also said that he will [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]⁷³

128. In asking [REDACTED] [REDACTED]
[REDACTED]
[REDACTED] followed by a statement of [REDACTED]—is, for reasons discussed in more detail below, not consistent with industry practice in discussing transactions done for hedging or other legitimate purposes.

129. ICAP's trading data show that on October 5, 2007, Barclays sold [REDACTED] in notional in 2 year swaps around 11:00 a.m.⁷⁴ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Barclays bought a net amount of [REDACTED] in notional of 2 year

⁷² These transactions are timestamped between 11:43 a.m. and 11:44 a.m.

⁷³ BARC-IFX_00011596 (transcript of BARC-IFX_00006748) (emphasis added).

⁷⁴ This trade is timestamped at 11:28 a.m.

Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 2 year swaps.

15) *Citi tells ICAP:* [REDACTED]

130. On December 7, 2007, around 10:54 a.m., [REDACTED] (of ICAP) told [REDACTED]

[REDACTED] (also of ICAP): [REDACTED]

[REDACTED]⁷⁵

131. That an [REDACTED] might [REDACTED]

132. ICAP's trading data show that on December 7, 2007, Citi sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁷⁶ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Citi bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 10 year swaps.

⁷⁵ ICM-000019863 (emphasis added).

⁷⁶ These transactions are timestamped 11:13 a.m. and 11:37 a.m.

16) *Morgan Stanley tells ICAP that* [REDACTED]
[REDACTED]

133. On March 3, 2008, around 10:47 a.m., [REDACTED] (of ICAP) told [REDACTED] (the ICAP broker with primary responsibility for Morgan Stanley) that at [REDACTED]
[REDACTED]⁷⁷

134. Based on my experience, in this context [REDACTED] clearly refers to the 15 year tenor on the 19901 Screen. [REDACTED] admitted at his deposition that [REDACTED]
[REDACTED]
[REDACTED]⁷⁸.

135. ICAP's trading data show that Morgan Stanley on March 3, 2008, bought [REDACTED] in notional in 15 year swaps around 11:00 a.m.⁷⁹ That transaction was the only transaction in this tenor brokered by ICAP that day, and would have had the effect of pushing up the rates for 15 year swaps.

17) *Credit Suisse thanks ICAP* [REDACTED]
[REDACTED]

136. On March 12, 2008, at 1:16 p.m., [REDACTED] (of Credit Suisse) and [REDACTED] (of ICAP) had the following exchange:⁸⁰

[REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

⁷⁷ ICM-001511376. [REDACTED] testified that [REDACTED] was a trader at Morgan Stanley. [REDACTED] also confirmed that this request had been made to [REDACTED] while [REDACTED] Tr. 265:20-267:10.

⁷⁸ [REDACTED] Tr. 267:7-10 & 268:15-269:10.

⁷⁹ The transaction is timestamped 11:09 a.m.

⁸⁰ ICM-000092023 (emphasis added).

[REDACTED]

137. The discussion about [REDACTED]

[REDACTED]

138. The more important part of this conversation is where the broker responds by saying that [REDACTED]

[REDACTED] Again, [REDACTED]

[REDACTED] The phrase [REDACTED] thus

[REDACTED] The reference to [REDACTED] shows that the trader wanted [REDACTED]

139. ICAP's trading data show that on March 12, 2008, Credit Suisse sold [REDACTED] in notional in 2 year swaps around 11:00 a.m.⁸¹ These transactions would have had the effect of pushing down the rate for 2 year swaps.

18) *Barclays tells ICAP that* [REDACTED]

140. On March 12, 2008, [REDACTED] (of Barclays) and [REDACTED] (of ICAP) had the following exchange, beginning around 10:57 a.m.:⁸²

[REDACTED]

[REDACTED]

[REDACTED]

⁸¹ These transactions are time-stamped between 11:26 a.m. and 11:27 a.m.

⁸² BARC-IFX-C_00001079; BARC-IFX_00011797

141. This call continued in the minutes leading up to 11:00 a.m., with [REDACTED] giving [REDACTED] directions, and [REDACTED] [REDACTED]. [REDACTED] eventually reports back to [REDACTED] just seconds after 11:00 a.m.:

[REDACTED] [REDACTED]

142. This exchange reveals that the trader wanted ISDAfix reference rates [REDACTED] [REDACTED] [REDACTED] [REDACTED]. This is a straightforward example of a trader manipulating the 19901 Screen at 11:00 a.m.

143. ICAP's trading data show that March 12, 2008, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁸³ These transactions would have had the effect of pushing down the rate of 10 year swaps.

19) *Citi traders* [REDACTED] [REDACTED]

144. During a chat at 5:39 p.m. on March 17, 2008, [REDACTED] (of Citi) asked [REDACTED] (also of Citi) [REDACTED] replied:

[REDACTED] then asked: [REDACTED]

[REDACTED]

[REDACTED]⁸⁴

⁸³ These transactions are timestamped between 11:21 a.m. and 11:24 a.m.

⁸⁴ Citi-ISDAFIX-Civil-00117530 (emphasis added).

145. The question regarding whether [REDACTED] shows that [REDACTED] was asking [REDACTED] whether [REDACTED] [REDACTED] rates. [REDACTED] replies indicate that he believed [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED] [REDACTED]

146. ICAP's trading data show that March 17, 2008, Citi sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.⁸⁵ ICAP's trading data also show that on March 17, 2008, Citi bought a net amount of [REDACTED] notional in 10 year Treasuries. Combined, these transactions would have had the effect of pushing down ISDAfix rates for the 10 year tenor.

20) *Citi tell ICAP* [REDACTED] [REDACTED]

147. On April 9, 2008, [REDACTED] (on Citi's exotics interest rate products desk) had the following exchange with [REDACTED] (the head of Citi's interest rate swaps desk):⁸⁶

[REDACTED] [REDACTED] [REDACTED]

⁸⁵ This transaction is timestamped 11:09 a.m.

⁸⁶ Citi-ISDAFIX-Civil-00000488.

[REDACTED]

148. The statement [REDACTED] indicates C [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. Thus, [REDACTED]

[REDACTED]

[REDACTED]

149. [REDACTED] then inquires: [REDACTED] That

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Accordingly, an

[REDACTED]

[REDACTED]

150. When confronted with a transcript of this conversation, [REDACTED] claimed that [REDACTED]

[REDACTED].⁸⁷ But it is

not consistent with industry hedging practice [REDACTED]

[REDACTED] Further, [REDACTED], testified that

⁸⁷ Deposition of [REDACTED] (Jun. 6, 2017), Tr. 256:11-23 [REDACTED]

[REDACTED]

██████ was not providing enough information for ██████ to execute a hedge, and was instead,

██████⁸⁸

151. ICAP's trading data show that on April 9, 2008, Citi sold ██████ in notional in 2 year swaps and purchased ██████ notional in 10 year swaps around 11:00 a.m.⁸⁹ Combined, these transactions would have had the effect of pushing down the rates for 2 year swaps, and pushing up the rates for 10 year swaps.

21) *BNPP advertises internally:* ██████

152. On May 14, 2008, ██████ (of BNPP) let it be known to other BNPP traders, including swaps desk head ██████, that ██████
 ██████⁹⁰ That same day, at 11:00 a.m, ██████ (of ICAP) sent a message to ██████ (of BNPP): ██████⁹¹ Later, ██████ wrote to ██████ saying: ██████⁹²

153. The statement by ██████
 ██████. In context, this means that ██████
 This is confirmed by the fact that the trader refers to the ██████ *i.e.*, ██████

⁸⁸ Deposition of ██████ (Jun. 15, 2017), Tr. 177:4-11. *See also, id.* Tr. 182:9-14. (██████

██████; Tr. 176:10-16 (██████

⁸⁹ These transactions are timestamped 11:09 a.m. and 11:16 a.m.

⁹⁰ BNPP_AK_00062049.

⁹¹ ICM-001102260

⁹² BNPP_AK_00103389.

██████████. The stated goal of wanting ██████████ refers to ██████████. If the rates for two tenors are closer together, the curve is said to be ██████████. If the rates for two tenors are further apart, the curve is said to be ██████████. Thus, the trader is saying ██████████. Again, “screen” in this context is the 19901 Screen, which was used to set ISDAfix reference rates at 11:00 a.m.

154. ICAP’s trading data show that on May 14, 2008, BNPP sold ██████████ in notional in 10 year swaps and bought ██████████ in notional in 30 year swaps around 11:00 a.m.⁹³ Combined, these transactions would have had the effect of pushing down the rate for 10 year swaps, and pushing up the rate for 30 year swaps.

22) *Citi tells ICAP* ██████████

155. On June 6, 2008, ██████████ (of Citi) and ██████████ (of Citi) had an exchange remarkably similar to the April 9, 2008 exchange discussed above. ██████████ told ██████████ he had ██████████. ██████████ then continued: ██████████. ██████████ responded: ██████████. ██████████ confirmed: ██████████.⁹⁴

156. The reference to ██████████ means that ██████████ had a position whereby

██

██

██

██

██

⁹³ These transactions are timestamped between 11:09 a.m. and 11:40 a.m.

⁹⁴ Citi-ISDAFIX-Civil-00000493. Emphasis added.

[REDACTED]

[REDACTED]

[REDACTED]

157. ICAP's trading data show that on June 6, 2008, Citi purchased [REDACTED] in notional in 2 year swaps around 11:00 a.m.⁹⁵ Combined, these transactions would have had the effect of pushing up rates for 2 year swaps.

23) ICAP agrees with Barclays [REDACTED]

158. On July 17, 2008, at 11:05 a.m. [REDACTED] (of Barclays) discussed the 2 year tenor rates with [REDACTED] (of ICAP). [REDACTED] said that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]⁹⁶

159. At 11:12 a.m., [REDACTED] (of ICAP) sent a message to [REDACTED] (of

[REDACTED]

[REDACTED]

[REDACTED]⁹⁷

160. In his exchange with [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

In his exchange with [REDACTED]

⁹⁵ These transactions are timestamped between 11:04 a.m. and 11:06 a.m.

⁹⁶ BARC-IFX-C_00000038.

⁹⁷ GS-ISDAFIX-CIVIL-00003352.

161. ICAP's trading data show that, on July 17, 2008, Goldman purchased [REDACTED] in notional in 2 year swaps around 11:00 a.m.⁹⁸ This transaction would have had the effect of pushing up the rates for 2 year swaps.

24) BNPP agrees internally that [REDACTED]

162. On July 28, 2008, [REDACTED] (of BNPP) and [REDACTED] (also of BNPP) discussed [REDACTED]

[REDACTED] After 11:00 a.m., Gaubert reported that the [REDACTED]

[REDACTED].⁹⁹

163. As discussed above, the relationship between rates in two different tenors is said to be "flat" when the rates are close together. The exchange between [REDACTED] thus shows that [REDACTED] wanted the 10 year and 30 year ISDAfix rates to be closer together.

[REDACTED] demonstrates that [REDACTED] was attempting to achieve this by using as little 'ammo' as possible.

164. ICAP's trading data shows that on July 28, 2008, BNPP purchased [REDACTED] in notional in 10 year swaps and sold [REDACTED] in notional in 30 year swaps around 11:00 a.m.¹⁰⁰ Combined, these transactions would have had the effect of pushing up the rates for 10 year swaps, and pushing down the rates for 30 year swaps.

⁹⁸ This transaction is timestamped 11:18 a.m.

⁹⁹ BNPP_AK_00035090(emphasis added). The 10 year trade is timestamped 11:17 a.m. The 30 year trade is timestamped 11:20 a.m.

¹⁰⁰ These transactions are timestamped 11:09 a.m. and 11:20 a.m.

25) *Barclays tells ICAP it wants* [REDACTED]

165. On September 10, 2008, [REDACTED] (of Barclays) told [REDACTED] (of ICAP) that he wanted to [REDACTED]¹⁰¹ [REDACTED] previewed that a fellow Barclays trader [REDACTED] was going to come in and [REDACTED] [REDACTED] confirmed [REDACTED] had a “bit of ammo.”¹⁰² Later, when [REDACTED] warned that [REDACTED] [REDACTED] made clear [REDACTED]¹⁰³ Later in the day, another Barclays trader was told: [REDACTED]

[REDACTED]

[REDACTED]¹⁰⁴

166. Together, this language shows that Barclays [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] The reference [REDACTED]

[REDACTED]

[REDACTED]

167. ICAP’s trading data show that on September 10, 2008, Barclays purchased [REDACTED] [REDACTED] in notional in 2 year swaps, sold [REDACTED] in notional in 9 year swaps, and sold [REDACTED] [REDACTED] in notional in 10 year swaps, all around 11:00 a.m.¹⁰⁵ ICAP’s trading data also show that, between 10:59 and 11:00 a.m. on that day, Barclays sold a net amount of [REDACTED] in notional

¹⁰¹ BARC-IFX_00082917.

¹⁰² *Id.*

¹⁰³ BARC-IFX_00082919.

¹⁰⁴ BARC-IFX_00064263 (emphasis added).

¹⁰⁵ These transactions are timestamped between 11:25 and 11:31 a.m.

of 2 year Treasuries, and bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing up the rates for 2 year swaps, and pushing down the rates for 9 and 10 year swaps.

26) *Barclays tells ICAP:* [REDACTED]

168. On September 18, 2008, [REDACTED] (of Barclays) informed an ICAP broker that [REDACTED]

[REDACTED]

[REDACTED]¹⁰⁶ The broker later said: [REDACTED]

[REDACTED]¹⁰⁷

169. As with several of the examples above, the reference to [REDACTED]

[REDACTED]

[REDACTED]. The reference to [REDACTED] confirms that

Barclays [REDACTED] and

reveals that it is [REDACTED] [REDACTED] The ICAP broker's

reply confirms [REDACTED]

[REDACTED]

[REDACTED], *i.e.*, to [REDACTED]

170. ICAP's trading data show that on September 18, 2008, Barclays purchased [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹⁰⁸ Combined, these transactions would have had the effect of pushing up the rates for 10 year swaps.

¹⁰⁶ BARC-IFX_00045684 (emphasis added).

¹⁰⁷ BARC-IFX-C_00001210 (emphasis added).

¹⁰⁸ These transactions are timestamped 11:10 a.m. and 11:11 a.m.

27) *Barclays tells ICAP:* [REDACTED]

171. On September 22, 2008, [REDACTED] (of Barclays) again called an ICAP broker saying: [REDACTED] said he had [REDACTED]

[REDACTED] The broker confirmed [REDACTED]

[REDACTED]¹⁰⁹

172. This example shows [REDACTED]

[REDACTED], *i.e.*, that

Barclays [REDACTED] Barclays also confirmed that it was

[REDACTED]. As it did four days earlier, ICAP responded agreeing that [REDACTED]

173. ICAP's trading data show that on September 22, 2008, Barclays purchased [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹¹⁰ This transaction would have had the effect of pushing up rates for 10 year swaps.

28) *BNPP discusses* [REDACTED]

174. On October 9, 2008, [REDACTED] (of BNPP) and [REDACTED] (of BNPP) had the following exchange:¹¹¹

[REDACTED]

[REDACTED]

[REDACTED]

¹⁰⁹ BARC-IFX_00007201 (emphasis added).

¹¹⁰ This transaction is timestamped 11:18 a.m.

¹¹¹ BNPP_AK_00058471

175. ICAP broker [REDACTED] warned BNPP trader [REDACTED] at 10:52 a.m. that it was [REDACTED]¹¹²

176. Later that day, other BNPP traders [REDACTED] discussed what [REDACTED].¹¹³

177. Again, “screen” in this context refers to the 19901 Screen, which was used to set ISDAfix reference rates at 11:00 a.m. The phrase [REDACTED] refers to [REDACTED]

178. ICAP’s trading data show that October 9, 2008, BNPP sold [REDACTED] in notional in 10 year swaps, and purchased [REDACTED] in notional in 30 year swaps, around 11:00 a.m.¹¹⁴ ICAP’s trading data also show that, between 10:59 and 11:00 a.m. on that day, BNPP bought a net amount of [REDACTED] in notional of 10 year Treasuries, and sold a net amount of [REDACTED] in notional of 30 year Treasuries. Combined, these transactions would have had the effect of pushing down the rate for 10 year swaps, and pushing up the rate for 30 year swaps.

29) Barclays tells ICAP: [REDACTED]

179. On November 14, 2008, [REDACTED] (of Barclays) and [REDACTED] (of ICAP) had the following exchange, beginning around 10:57 a.m..¹¹⁵

¹¹² ICM-000859264.

¹¹³ BNPP_AK_00085736 (emphasis added).

¹¹⁴ These transactions are timestamped between 10:55 a.m. and 11:46 a.m.

¹¹⁵ BARC-IFX_00007205, BARC-IFX_00011633 (emphasis added).

[REDACTED]

[REDACTED]

180. On a second call later that same day:

[REDACTED]

[REDACTED]

181. In this first exchange Barclays informed ICAP that [REDACTED]

[REDACTED], *i.e.*, [REDACTED] [REDACTED]

[REDACTED] ICAP confirmed that Barclays [REDACTED]

[REDACTED], and then agreed that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

182. ICAP's trading data show that on November 14, 2008, Barclays sold [REDACTED] in notional in 5 year swaps around 11:00 a.m.¹¹⁶ This transaction would have had the effect of pushing down rates for 5 year swaps.

30) *Citi* [REDACTED]

183. On November 18, 2008 [REDACTED] (of Citi) told a colleague that [REDACTED]

[REDACTED] and was asked [REDACTED] [REDACTED] responded:

[REDACTED]¹¹⁷

¹¹⁶ This transaction is timestamped 11:06 a.m.

184. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. In context, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

185. ICAP's trading data show that on November 18, 2008, between 10:57 and 11:00 a.m., Citi sold a net amount of [REDACTED] in notional of 30 year Treasuries. Combined, these transactions would have had the effect of pushing up rates for 30 year swaps.

31) Credit Suisse [REDACTED]

186. On November 24, 2008, [REDACTED] (of ICAP) was recorded saying that [REDACTED]

[REDACTED]

[REDACTED]¹¹⁸

187. The reference to [REDACTED] shows that Credit Suisse

[REDACTED]. The reference to [REDACTED]

[REDACTED]

[REDACTED]. And the reference to [REDACTED] reveals that Credit Suisse

[REDACTED]

[REDACTED].

¹¹⁷ Citi-ISDAFIX-Civil-00107180 (emphasis added).

¹¹⁸ BARC-IFX-C_00001172 (emphasis added).

188. ICAP's trading data show that on November 24, 2008, Credit Suisse bought [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹¹⁹ Combined, these transactions would have had the effect of pushing up rates for 10 year swaps.

32) Citi traders [REDACTED]

189. On January 30, 2009 [REDACTED] (of Citi) approached [REDACTED] (also of Citi),

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]¹²⁰

190. [REDACTED] inquiry to [REDACTED] shows that on January 30, 2009, [REDACTED] : [REDACTED]

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

191. [REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED] [REDACTED] [REDACTED]. Rather, [REDACTED]
[REDACTED]
[REDACTED]

¹¹⁹ These transactions are timestamped 11:04 a.m. and 11:13 a.m.

¹²⁰ Citi-ISDAFIX-Civil-00042872

192. ICAP's trading data show that on January 30, 2009, Citi sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹²¹ This transaction would have had the effect of pushing down rates for 10 year swaps.

33) *Wells Fargo has* [REDACTED]

193. On February 9, 2009, [REDACTED] (a derivatives trader at Wells Fargo) chatted with

[REDACTED] (an interest rate swap trader at Wells Fargo). [REDACTED]

[REDACTED]¹²⁴

194. [REDACTED]

[REDACTED]. Thus, the offer to [REDACTED] refers to

195. ICAP's trading data show that on February 9, 2009, Wells Fargo purchased [REDACTED] in notional of 10 year swaps around 11:00 a.m.¹²⁵ This transaction would have had the effect of pushing up the rate of 10 year swaps.

¹²¹ This transaction is timestamped 11:22 a.m.

¹²² AK-WF00004347

¹²³ [REDACTED] appears to be shorthand for [REDACTED] r. [REDACTED] is likely to be [REDACTED], another Wells Fargo trader.

¹²⁴ AK-WF00004505

¹²⁵ This transaction is timestamped 11:14 a.m.

34) Goldman tells ICAP: [REDACTED]
[REDACTED]

196. On March 16, 2009, [REDACTED] (of Goldman) sent a message to [REDACTED] (of ICAP) making plain, [REDACTED]
[REDACTED]¹²⁶ After the reference rates were set, ICAP informed [REDACTED] that as of 11:17 a.m. he was [REDACTED]

[REDACTED]¹²⁷

197. The reference to [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

198. [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED] apparently on the basis that [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

¹²⁶ ICM-000071876 (emphasis added).

¹²⁷ ICM-000263749.

199. ICAP's trading data show that on March 16, 2009, Goldman sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹²⁸ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Goldman sold a net amount of [REDACTED] in notional of 5 year Treasuries and bought a net amount of [REDACTED] million in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing up rates for 5 year swaps and pushing down rates for 10 year swaps.

35) Barclays has [REDACTED]
[REDACTED]

200. On November 12, 2009, [REDACTED] and an ICAP broker had the following exchange, beginning around 10:56 a.m.:¹²⁹

A horizontal bar chart comparing the percentage of respondents who believe the U.S. should take action to address climate change, categorized by age group and gender. The chart shows that younger age groups and females are more likely to support taking action.

Age Group	Gender	Percentage
18-29	Male	55%
	Female	65%
30-49	Male	45%
	Female	55%
50-69	Male	60%
	Female	40%
70+	Male	35%
	Female	45%
18-29	Male	55%
	Female	65%
30-49	Male	45%
	Female	55%
50-69	Male	60%
	Female	40%
70+	Male	35%
	Female	45%
18-29	Male	55%
	Female	65%
30-49	Male	45%
	Female	55%
50-69	Male	60%
	Female	40%
70+	Male	35%
	Female	45%
18-29	Male	55%
	Female	65%
30-49	Male	45%
	Female	55%
50-69	Male	60%
	Female	40%
70+	Male	35%
	Female	45%

¹²⁸ This transaction is timestamped 11:02 a.m.

¹²⁹ BARC-IFX-C 00000517; BARC-IFX 00012543

[REDACTED] [REDACTED]

201. The trader's focus is [REDACTED]

[REDACTED]

[REDACTED]. There is also the timing dimension: [REDACTED]

[REDACTED]

202. The trader [REDACTED]

[REDACTED] [REDACTED] [REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED]. At the end of the conversation—still before 11:00 a.m.—the trader confirms [REDACTED]

[REDACTED]

203. ICAP's trading data show that on November 12, 2009, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹³⁰ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on this day, Barclays bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rate of 10 year swaps.

36) Goldman tells ICAP [REDACTED]

204. On December 14, 2009, at approximately 10:11 a.m., [REDACTED] (Goldman Sachs) sent a message to [REDACTED] (ICAP broker) saying [REDACTED]

[REDACTED] at approximately 10:13 a.m., [REDACTED] responded: [REDACTED]

[REDACTED]¹³¹ Later that day, at approximately 2:18 p.m., [REDACTED] sent an

¹³⁰ This transaction is timestamped 11:07 a.m.

¹³¹ ICM-000112864

[REDACTED]

[REDACTED]

[REDACTED]¹³²

205. The reference to Goldman [REDACTED] is a reference to [REDACTED] [REDACTED] response that this would [REDACTED]

[REDACTED]

[REDACTED]. The reference to having [REDACTED] and [REDACTED]

[REDACTED]

[REDACTED]

206. ICAP's trading data show that on December 14, 2009, Goldman bought [REDACTED] [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹³³ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Goldman bought a net amount of [REDACTED] in notional of 5 year Treasuries. Combined, these transactions would have had the effect of pushing down the rates for 5 year swaps, and pushing up the rates for 10 year swaps.

37) Barclays tells ICAP to [REDACTED]

207. On April 26, 2010, [REDACTED] (of Barclays) informed an ICAP broker [REDACTED]

[REDACTED] At 10:54 a.m., the broker inquires, [REDACTED]

[REDACTED]¹³⁴

208. As in other examples discussed above, Barclays' reference to wanting to [REDACTED] [REDACTED] means that [REDACTED]

[REDACTED]. The response from ICAP demonstrates that [REDACTED]

¹³² GS-ISDAFIX-CIVIL-00108246

¹³³ The transaction is timestamped 11:41 a.m.

¹³⁴ BARC-IFX-C_00000537 (emphasis added).

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] In this instance, Barclays [REDACTED]

[REDACTED]

209. ICAP's trading data show that on April 26, 2010, Barclays sold net [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹³⁵ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Barclays bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down rates for 10 year swaps.

38) Barclays tells ICAP [REDACTED]

[REDACTED]

210. On August 10, 2010, in various recorded conversations between Barclays traders and ICAP, a Barclays trader asked to be picked up (*i.e.*, taken [REDACTED])

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹³⁶

211. The reference to [REDACTED] shows that Barclays was concerned

[REDACTED]

[REDACTED]

¹³⁵ These transactions are timestamped 11:12 a.m. and 11:13 a.m.

¹³⁶ BARC-IFX_00063898.

[REDACTED] The references to the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

212. ICAP's trading data show that on August 10, 2010, Barclays sold [REDACTED] in notional in 2 year swaps and purchased [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹³⁷ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, BNPP bought a net amount of [REDACTED] in notional of 2 year Treasuries, and sold a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down rates for 2 year swaps, and pushing up rates for 10 year swaps.

39) *Citigroup senior* [REDACTED]

[REDACTED]

213. On September 17, 2010, [REDACTED] (a Citi junior associate) wrote to [REDACTED] (a Citi trader) asking [REDACTED]

[REDACTED] In the dialogue that followed, [REDACTED]

and having [REDACTED] answer, a series of questions about [REDACTED]

[REDACTED].¹³⁸

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹³⁷ These transactions are timestamped between 11:10 a.m. and 11:22 a.m.

¹³⁸ Citi-ISDAFIX-Civil-00128749 (emphasis added). Rather than using the "[sic]" notation multiple times, I have reproduced this transcript as it appeared to me, including with all typographical errors and misspellings.

[REDACTED]

214. [REDACTED] then turned to the facts of the [REDACTED] about which [REDACTED] had first inquired:

[REDACTED]

215. In the first exchange, [REDACTED] is asking [REDACTED] [REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

[REDACTED]

216. In the second exchange, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

217. ICAP's trading data show that on September 17, 2010, Citi purchased [REDACTED] in notional in 7 year swaps around 11:00 a.m.¹³⁹ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Citi sold a net amount of [REDACTED] in notional of 7 year Treasuries. Combined, these transactions would have had the effect of pushing up the rates for 7 year swaps.

40) *Morgan Stanley has* [REDACTED]

[REDACTED]

218. On May 5, 2011, two [REDACTED] traders named [REDACTED] [REDACTED] engaged in a chat with [REDACTED] (of Deutsche Bank) about [REDACTED]

¹³⁹ These transactions are timestamped between 11:06 a.m. and 11:26 a.m..

[REDACTED]

[REDACTED] admitted that he [REDACTED]

[REDACTED] When [REDACTED] pressed [REDACTED] (at Deutsche

[REDACTED]

[REDACTED]

[REDACTED]¹⁴¹

219. In response—after suggesting that [REDACTED]¹⁴²—

[REDACTED] (Deutsche Bank) joined a call with [REDACTED] and [REDACTED] (also at

Deutsche Bank). On that call, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁴³

220. [REDACTED] suggestion that [REDACTED]

[REDACTED]

[REDACTED]

¹⁴⁰ DB-SDNY-ISDAFIX 00017011.

¹⁴¹ *Id.* [REDACTED]

¹⁴² *Id.*

¹⁴³ DB-SDNY-ISDAFIX_00248816.

[REDACTED]

[REDACTED]

221. In my opinion, based on this exchange, [REDACTED] named Morgan Stanley as being

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

222. ICAP's trading data show that on May 5, 2011, Morgan Stanley sold [REDACTED] in notional in 2 year swaps around 11:00 a.m.¹⁴⁴ This transaction would have had the effect of pushing down the rates for 2 year swaps.

41) *Deutsche Bank warns ICAP* [REDACTED]

[REDACTED]

223. On May 12, 2011, [REDACTED] (of Deutsche Bank) warned [REDACTED] (of ICAP) to [REDACTED]

[REDACTED]¹⁴⁵ [REDACTED]

224. The phrase [REDACTED] [REDACTED] that

[REDACTED]. Again, [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]. The expression [REDACTED]

¹⁴⁴ This transaction is timestamped 11:07 a.m.

¹⁴⁵ ICM-000610655.

[REDACTED]

[REDACTED]

225. ICAP's trading data show that on May 12, 2011, Deutsche Bank sold [REDACTED] in notional in 7 year swaps around 11:00 a.m. ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Deutsche Bank bought net [REDACTED] in notional of 7 year Treasuries. Combined these transactions would have had the effect of pushing down rates for 7 year swaps.

42) *Barclays tells ICAP that* [REDACTED]

226. On July 11, 2011 around 10:49 a.m., [REDACTED] (of Barclays) and [REDACTED] (of ICAP) discussed how [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁴⁷

227. As with other examples above, the reference to Barclays having [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

¹⁴⁶ BARC-IFX-C_00000579 (emphasis added).

¹⁴⁷ *Id.*

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

228. ICAP's trading data show that on July 11, 2011, Barclays sold [REDACTED] in notional in 10 year swaps around 11:00 a.m.¹⁴⁸ ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Barclays bought a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down rates for 10 year swaps.

43) *Barclays tells ICAP it has* [REDACTED]

229. On March 12, 2012, [REDACTED] (of Barclays) and an ICAP broker had the following exchange beginning around 9:59 a.m.:¹⁴⁹

[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]
	[REDACTED]

¹⁴⁸ This transaction is timestamped 11:01 a.m.

¹⁴⁹ BARC-IFX-C_00000100 (emphasis added).

[REDACTED]

230. Much in this conversation is not consistent with industry practice in terms of how traders would discuss a trade done for hedging or other legitimate purposes. To the contrary, when the jargon is deciphered this exchange reveals that the [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

231. This conversation also reveals [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

232. The purpose of [REDACTED] is also revealed by the reference to [REDACTED]

[REDACTED]

[REDACTED]¹⁵⁰ If a trader were only hedging, he or she would want the lowest swap rate possible and [REDACTED] [REDACTED] [REDACTED]

[REDACTED] A statement [REDACTED]

¹⁵⁰ Pursuant to the shorthand practices discussed above, “eight print” would refer to a rate or spread surrounding the key figure of “8.”

[REDACTED]

[REDACTED]

233. The Barclays trader [REDACTED] and the ICAP broker had a follow-up call beginning at 10:39 a.m.:¹⁵¹

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

234. This follow-up call is telling for several reasons. Here again [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

235. ICAP's trading data show that on March 12, 2012, Barclays sold [REDACTED] in notional in 2 year swaps and purchased [REDACTED] in notional in 10 year swaps, around 11:00 a.m.¹⁵² ICAP's trading data also show that, between 10:59 and 11:00 a.m. on that day, Barclays

¹⁵¹ BARC-IFX-C_00000101 (emphasis added).

¹⁵² These transactions are timestamped 11:06 a.m. and 11:14 a.m.

bought a net amount of [REDACTED] in notional of 2 year Treasuries, and sold a net amount of [REDACTED] in notional of 10 year Treasuries. Combined, these transactions would have had the effect of pushing down the rate for 2 year swaps, and pushing up the rate for 10 year swaps.

III. CONCLUSIONS REGARDING WHETHER THE EVIDENCE IN SECTION II IS CONSISTENT WITH LEGITIMATE HEDGING

236. I understand from Class Counsel that the Dealer Defendants are claiming, in their defense, that certain of the conduct at issue in this case was not an attempt to manipulate ISDAfix reference rates, but instead legitimate “hedging” activity.

237. As outlined at the beginning of this report, I have extensive experience regarding the language that traders and brokers use when they are attempting to hedge transactions. I also have extensive experience regarding when and how a trader would execute a hedge.

238. Based on my experience, and my review of the relevant chats, messages, audio transcripts, and trading data in respect of the sample of occasions I discuss above, I conclude that those occasions are not consistent with legitimate hedging. The relevant evidence is instead consistent with trades being done to impact ISDAfix rates. There are multiple reasons for this conclusion.

239. *First*, it is not consistent with industry practice in discussing transactions done for hedging or other legitimate purposes to state a desire to get a [REDACTED]¹⁵³

¹⁵³ See, e.g., the discussions above for Barclays, March 12, 2012 [REDACTED]; Goldman, January 30, 2007 [REDACTED]; Goldman, January 30, 2007 ([REDACTED]); JPMorgan, May 9, 2007 [REDACTED]; Goldman, January 19, 2007 ([REDACTED]); Credit Suisse, November 24, 2008 [REDACTED]; Citi, January 30, 2009 [REDACTED]; BNPP, October 14, 2010 ([REDACTED])

including to get a print, fix, or setting at a specific rate.¹⁵⁴ Similarly, there is no legitimate hedging purpose to refer to [REDACTED]¹⁵⁵ [REDACTED],¹⁵⁶ or [REDACTED]¹⁵⁷

240. The practice of traders buying or selling instruments specifically to affect market rates at a particular time is commonly known as “banging the close”. If a trader has motive to achieve a certain price at a certain time, for example a desired 19901 screen rate at 11:00 am, a trader can “bang the close” by executing a substantial volume of trades shortly before that time to move prices and obtain the desired outcome. By contrast, traders entering into transactions purely for legitimate hedging purposes would seldom be motivated by prices on Screen 19901 at exactly 11:00 a.m., nor by ISDAfix reference rates or final ISDAfix rates on a given day. They would instead be concerned with entering transactions sufficient to hedge their existing risk.

241. *Second*, hedging is typically conducted on a regular basis, and requires assessing the risk of a portfolio of positions in light of the current state of the market. When a party is required to enter into a hedging transaction, their focus is on current market prices, and the terms of the transactions that they need to enter in order to successfully hedge their existing risk.

¹⁵⁴ See, e.g., the discussions above for Barclays, July 30, 2007 ([REDACTED]); RBS, June 13, 2007 ([REDACTED]).

¹⁵⁵ See, e.g., the discussions above for BNP, April 28, 2008 ([REDACTED]); Credit Suisse, March 12, 2008 ([REDACTED]). See also Deutsche Bank, May 12, 2011 (trader requesting that broker [REDACTED]).

¹⁵⁶ See, e.g., the discussions above for BNP October 9, 2008 ([REDACTED]); RBS, January 30, 2007 (discussing the [REDACTED]); Goldman, July 9, 2007 (ICAP referring to fact that Goldman [REDACTED]).

¹⁵⁷ See, e.g., the discussions above for BNP, May 14, 2008 ([REDACTED]); UBS and RBS, May 10, 2006 ([REDACTED]); Deutsche Bank, May 21, 2007 ([REDACTED]); Barclays, July 11, 2011 ([REDACTED]).

242. However, it is *not* consistent with industry hedging practice to seek to effect *directional change* of prices in the market in which you are seeking to execute the hedging transaction. Legitimate hedging in respect of interest rate derivative positions should have nothing to do with achieving price movements on the 19901 Screen, or achieving particular ISDAfix rates. Thus, it is not consistent with industry hedging practice to discuss trades in terms of [REDACTED]¹⁵⁸ or in terms of wanting to see prices being [REDACTED]¹⁵⁹ and especially not to have these effects occur as close as possible to 11:00 a.m.¹⁶⁰ Rather, language indicating that a trader or broker is focused on the directional impact a trade will have on the 19901 Screen at 11:00 a.m. is more consistent with an attempt to move ISDAfix reference rates to artificial levels.

243. *Third*, and similarly, it would be consistent with industry practices for a party attempting to hedge their risk to discuss with their broker the notional value of the transactions that the trader wants to enter into in order to achieve that hedge (*e.g.*, for a trader to instruct a broker that they needed to buy or sell a set value of swaps in order to achieve the hedge). Indeed, the volume of the transactions that a party needs to enter in order to hedge is typically very well

¹⁵⁸ See, *e.g.*, BARC-IFX_00045399, involving Barclays on November 10, 2008.

¹⁵⁹ See, *e.g.*, examples for Barclays November 12, 2009 [REDACTED]; Citi, April 9, 2008 (discussing how to [REDACTED]; RBS, June 13, 2007 (discussing plan to [REDACTED]); UBS, April 17 2008 (discussing how to get the [REDACTED]); Wells Fargo, February 9, 2009 (discussing an attempt to [REDACTED]); Barclays, March 14, 2007 (referring to [REDACTED]; Citi, December 7, 2007 (referring to [REDACTED]; Goldman, April 18, 2008 (Goldman trader instructing colleagues to [REDACTED]; Barclays, September 18, 2008 (discussing [REDACTED] and [REDACTED]; Barclays, November 14, 2008 (referring to [REDACTED]; Citi, November 18, 2008 (referring to [REDACTED]; Barclays, August 10, 2010 (referring to [REDACTED] with Barclays giving ICAP [REDACTED] Barclays had [REDACTED]).

¹⁶⁰ RBS, June 13, 2007 (discussing [REDACTED]; Citi, June 6, 2008 (describing plan to, [REDACTED]; Barclays, April 26, 2010 (referring to [REDACTED]. See also BARC-IFX_0001633, involving Barclays on November 14, 2008 (ICAP agreeing that, [REDACTED]

known to that party, because the relevant hedging requirements have been calculated precisely by a model designed for that purpose.

244. Accordingly, it is *not* consistent with industry practice for a party who is attempting to hedge their position to discuss the amount that they wish to buy or sell in terms of

████████████████████¹⁶¹ or ████████████████████ or ████████████████████
████████████████████¹⁶² Rather, a trader who uses expressions like ██████████ to refer to the notional quantity that they want to ██████████ is much more likely to be trading for some purpose other than legitimate hedging, such as effecting ISDAfix rates.¹⁶³

245. *Lastly*, it is not consistent with legitimate hedging for a trader's actions or stated intent to run *contrary* to his or her economic interests. If a trader needs to hedge a position, their interest (as in any transaction) is to buy as low as possible or to sell as high as possible. But such a trader would not want—if they could avoid it—to push swap rates in a direction that is adverse to their economic interests. Yet, in many of the sample instances considered above, this is exactly

¹⁶¹ See, e.g., examples offered above for Barclays, July 26, 2006 (referring to ████████████████████); Barclays, September 10, 2008 (discussing ████████████████████); ████████████████████.

¹⁶² See, e.g., examples offered above for Barclays, March 12, 2008 (answering ████████████████████); Barclays March 12, 2012 (trader planning how he was ████████████████████); Barclays, July 30, 2007 (trader saying ████████████████████); BNP, April 28, 2008 (referring to ████████████████████); Credit Suisse, March 12, 2008 (trader referring to wanting to do ████████████████████); Deutsche Bank, May 12, 2011 (referring to ████████████████████); Goldman, January 30, 2007 (trader and broker discussing the ████████████████████); Barclays, January 4, 2007 (referring to "██████████████████"); ████████████████████); BNPP, July 28, 2008 (discussing trying ████████████████████); Barclays, September 22, 2008 (referring to ████████████████████); ████████████████████.

¹⁶³ See, e.g., the discussion above for Barclay on, March 12, 2008. There, ████████████████████

what the language and trade data suggests that traders at the Dealer Defendants were doing.¹⁶⁴

Because these transactions would run contrary to economic sense if they were legitimate hedging transactions, it is obvious that they were not, and were instead attempts to move swap rates ahead of 11:00 a.m.

IV. GENERAL EVIDENCE OF MANIPULATION

246. My conclusion that ICAP and the Dealer Defendants regularly engaged in conversations and trades that were not consistent with industry custom and practice is also supported by more general evidence, that often is not tied to any specific trade. When the jargon is unpacked, it is apparent that even Defendants' general conversations are inconsistent with industry practice, and are instead consistent with an intent to manipulate ISDAfix rates.

247. *Evidence showing explicit recognition of ISDAfix manipulation.* In several of the specific trading instances described above, the Dealer Defendants and ICAP refer to [REDACTED] or similar terms, when describing trading affecting the 1990 Screen around 11:00 a.m. Such language often appears elsewhere in Defendants' communications. For example:

248. On August 28, 2008, [REDACTED] (Barclays) contacted [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁶⁵ This exchange indicates that at least four banks (Barclays,

¹⁶⁴ See, e.g., the discussions above for Barclays, on March 12, 2008, where the relevant trader is going against his best interests if he were hedging as he is selling at lower prices than he could otherwise [REDACTED]; Goldman, January 30, 2007 (stating a need [REDACTED]; Barclays, July 26, 2006 (where trader expresses a desire to "[REDACTED]" when, if he actually intended to hedge, he would preferred to wait and sell at a higher price rather than forcing prices lower); Barclays, January 4, 2007 (where the trader instructed ICAP [REDACTED] where, if that trader had actually been attempting to hedge, she should have wanted prices to rise because resulted in a better sale price for Barclays).

¹⁶⁵ BARC-IFX-C_00001230 (emphasis added).

BNPP, RBS, Goldman) had an open conversation about [REDACTED] [REDACTED] The

[REDACTED]. This suggests that absent any new agreement the dealers *were* investing a [REDACTED]

249. On April 5, 2007, [REDACTED] (of Barclays) was involved in a Bloomberg chat with an unidentified person. [REDACTED] stated that [REDACTED]

[REDACTED] The other person responded: [REDACTED]

[REDACTED]¹⁶⁶ This exchange again shows that [REDACTED]

[REDACTED] with ISDAfix rates.

250. On April 26, 2007, [REDACTED] (of Barclays) called [REDACTED] (of ICAP) and expressed concern that [REDACTED]

[REDACTED] In response, [REDACTED] [REDACTED]

[REDACTED]¹⁶⁷ This communication is again a direct admission that ICAP knew the Dealer Defendants [REDACTED]

251. On June 12, 2008, around 11:00 a.m., [REDACTED] (of ICAP) wrote to his follow broker [REDACTED] noting that [REDACTED] responded [REDACTED]

[REDACTED]¹⁶⁸ This exchange shows ICAP [REDACTED]

¹⁶⁶ BARC-IFX_00007185.

¹⁶⁷ BARC-IFX_00011588.

¹⁶⁸ ICM-000069186.

252. Between December 6 and 12, 2007, in a series of emails ,BNPP employees [REDACTED] (Deputy Head of USD Options and Exotics Trading) and [REDACTED] [REDACTED] created and discussed a [REDACTED] [REDACTED]¹⁶⁹ In other words, BNPP's head of Options Trading was trying to [REDACTED] [REDACTED]

253. Similarly, on December 10, 2007, in a series of emails with [REDACTED] [REDACTED] opined that [REDACTED] in response to [REDACTED]¹⁷⁰ This is a direct admission that BNPP was [REDACTED] [REDACTED]

254. On July 25, 2008, [REDACTED] (of RBS) informed [REDACTED] (of Goldman) he was going to [REDACTED] noted: [REDACTED] [REDACTED]¹⁷¹ [REDACTED] responded by suggesting that [REDACTED] [REDACTED]¹⁷² This exchange shows the Dealer Defendants [REDACTED].

255. On August 28, 2008, [REDACTED] (of Wells Fargo) wrote to [REDACTED] (also of Wells Fargo) saying [REDACTED] [REDACTED] [REDACTED]

¹⁶⁹ BNPP_AK_00058133.

¹⁷⁰ BNPP_AK_00085791 (emphasis added).

¹⁷¹ RBS-Alaska-ISDA-002340025.

¹⁷² RBS-Alaska-ISDA-002340067.

[REDACTED]

[REDACTED]

[REDACTED]¹⁷³ This shows that traders were aware [REDACTED]

[REDACTED]

[REDACTED]

256. On November 14, 2008, [REDACTED] (Citi) emailed other traders saying

[REDACTED]

[REDACTED]¹⁷⁴ The reference to [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

257. On June 14, 2010, at 11:00:56, [REDACTED] (at JP Morgan) asked: [REDACTED]

[REDACTED] (also at JP Morgan) replied: [REDACTED]

[REDACTED]

[REDACTED] As revealed by this same conversation, Smith believed this kind of activity

occurred [REDACTED]¹⁷⁵ This conversation demonstrates both that such

¹⁷³ AK-WF00029135 (emphasis added).

¹⁷⁴ Citi-ISDAFIX-Civil-00073926 (emphasis added).

¹⁷⁵ JPMC-ISDA00016919.

[REDACTED]

258. On April 15, 2010, [REDACTED] (of Wells Fargo), in a chat room with other Wells Fargo employees, noted that there was a [REDACTED]

[REDACTED]¹⁷⁶ This exchange shows that the Dealer Defendants (in this case, Morgan Stanley in particular) were [REDACTED]

259. *Evidence demonstrating widespread Defendant knowledge of the methods traders would use to manipulate ISDAfix.* As explained in several places above—the traders at the Dealer Defendants were aware of multiple methods by which they could manipulate prices on the 19901 Screen shortly ahead of 11:00 a.m., and thus the ISDAfix reference rates.

260. On April 3, 2007, [REDACTED] (RBS) explained to [REDACTED] (RBS)

[REDACTED]¹⁷⁷ This statement shows one trader [REDACTED] [REDACTED] [REDACTED]

261. At 10:14 a.m. on October 31, 2008, for example, multiple RBS traders communicating in a group chat [REDACTED] [REDACTED] (ICAP) that [REDACTED]

[REDACTED] One of the traders responded by suggesting

¹⁷⁶ AK-WF00012031.

¹⁷⁷ RBS-Alaska-ISDA-001110342.

[REDACTED] In response, other traders explained to the group [REDACTED], writing:¹⁷⁸

- [REDACTED]
- [REDACTED]

262. This exchange reveals [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

263. *Evidence that ISDAfix rates were manipulated because they impacted swaptions or other interest rate derivatives.* Defendants' general conversations reveal not only that they were aware of ISDAfix manipulation, but also that such manipulation was occurring because the Dealer Defendants were seeking to profit on ISDAfix-linked products like [REDACTED] [REDACTED] and resets. For example:

264. On April 4, 2006, [REDACTED] (of Barclays) emailed [REDACTED] (also of Barclays), [REDACTED]

[REDACTED]

[REDACTED]¹⁷⁹ On a series of emails in August 2006, [REDACTED] similarly made clear to others within Barclays, when

¹⁷⁸ RBS-Alaska-ISDA-000622170 (emphasis added). Similarly, see the discussion above for RBS on June 13, 2007 (traders agreeing that manipulation [REDACTED])

¹⁷⁹ BARC-IFX_00002702.

[REDACTED], that [REDACTED]
[REDACTED] As this discussion progressed, the participants
concluded that [REDACTED] [REDACTED]¹⁸⁰ [REDACTED]
[REDACTED].

265. On April 17, 2008, [REDACTED] (of UBS) and [REDACTED] (also of UBS)
had the following exchange:¹⁸¹

[REDACTED]
[REDACTED] [REDACTED]

266. The reference to [REDACTED] indicates that [REDACTED] [REDACTED] [REDACTED]
[REDACTED] [REDACTED] [REDACTED]
[REDACTED]
[REDACTED]¹⁸³.

267. On August 28, 2008, [REDACTED] (of Wells Fargo) messaged [REDACTED]
(also of Wells Fargo) saying [REDACTED]
[REDACTED]¹⁸⁴

268. On October 14, 2010, [REDACTED] (of Citi) exchanged messages with
[REDACTED] (also of Citi), stating that "[REDACTED]
[REDACTED]¹⁸⁵ In these messages, Citi also stated that [REDACTED]
[REDACTED] The reference to that [REDACTED] [REDACTED]

¹⁸⁰ BARC-IFX_00007401 (emphasis added).

¹⁸¹ AK_UBS_0029742

¹⁸² Deposition of [REDACTED] (June 30, 2017), Tr. 179:2-5.

¹⁸³ *Id.*

¹⁸⁴ AK-WF00099525.

¹⁸⁵ Citi-ISDAFIX-Civil-00101692.

[REDACTED] shows that [REDACTED] [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

269. On September 15, 2011, [REDACTED] (of BNPP) engaged in a chat with

[REDACTED] (also of BNPP). [REDACTED]

[REDACTED]

[REDACTED] This again confirms that [REDACTED]

[REDACTED]. Confirming that this trading activity was not mere hedging, [REDACTED]

[REDACTED] To which Cleary responded: [REDACTED]¹⁸⁶

270. On September 22, 2011, [REDACTED] (BNPP) sent a message to [REDACTED] (ICAP) saying [REDACTED]

[REDACTED]¹⁸⁷ This communication reveals [REDACTED]

[REDACTED] [REDACTED]

[REDACTED], and makes clear that Dealer Defendants

[REDACTED] [REDACTED] [REDACTED].

271. *Evidence of agreements to keep the fact of ISDAfix manipulation a secret.* In addition to the general communications from Dealer Defendants that evidence their participation in, or awareness of, trading intended to affect the 19901 Screen and ISDAfix reference rates, there

¹⁸⁶ BNPP_AK_00083088.

¹⁸⁷ MS-Alaska00018093 (emphasis added).

are also communications showing that the Defendants want to keep such trading hidden from government regulators, and other brokers. For example:

272. On April 4, 2008, [REDACTED] (of ICAP) messaged [REDACTED] (also of ICAP) stating [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁸⁸ [REDACTED]

[REDACTED] Thus, [REDACTED]

[REDACTED]

[REDACTED]

273. On November 14, 2008, after the Wall St Journal reported that the New York Attorney General was investigating traders and brokers in the credit default swaps market,

[REDACTED] (BNPP) phoned [REDACTED] (Barclays) to urge that they had [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁸⁹ This call demonstrates [REDACTED]

[REDACTED]

274. *Evidence of Swaps Desks moving ISDAfix at the request of their Options Desks.*

In several of the examples above, it is apparent that a trader on the swaps desk for a given Dealer Defendant has been given instructions by, or undertaken to attempt to, move ISDAfix reference rates for a trader on the options desk at that same Dealer Defendant.

¹⁸⁸ ICM-001516979.

¹⁸⁹ BARC-IFX_00011635.

275. This scenario would often arise because the options desk would have a swaption whose value was determined by ISDAfix rates on a given day. Frequently, options desks that need to execute a swap transaction would be required to transact with their internal swap desk. For example:

276. On April 28, 2008, [REDACTED] (a swaps dealer at BNPP) asked BNPP's option traders if there's [REDACTED] (from the BNPP options desk) responded that [REDACTED] [REDACTED] later asks: [REDACTED]

[REDACTED] (also BNPP options desk) responded [REDACTED] and confirmed he is [REDACTED]

[REDACTED]¹⁹⁰ This conversation reveals [REDACTED]

277. Later that same day, BNPP trader [REDACTED] asked ICAP broker [REDACTED]

[REDACTED]¹⁹¹ This conversation demonstrates that [REDACTED]

278. Similarly, on May 18, 2008, [REDACTED] (ICAP) told [REDACTED] (BNPP) that Goldman Sachs [REDACTED] and noted they [REDACTED] [REDACTED] [REDACTED] [REDACTED] The BNPP trader responded: [REDACTED]

¹⁹⁰ BNPP_AK_00062131 (emphasis added).

¹⁹¹ BNPP_AK_00085541; BNPP_AK_00085617 (emphasis added).

[REDACTED]¹⁹² Again, this exchange confirms
 [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED].

279. *Evidence that ICAP got punished if it could not get “the print.”* As discussed above, the 19901 Screen was updated through a manual process. Thus, in times of high activity, if someone waited until the last seconds before 11:00 a.m., or if too many tenors were moving at once, there was a risk the “pecker” would not get the results inputted in time. The Dealer Defendants would react negatively to this outcome, which further support the conclusion that the Dealer Defendants were trading for the purpose of moving ISDAfix reference rates. For example:

280. On April 5, 2007, Barclays told ICAP that [REDACTED]
 [REDACTED] In a long telephone conversation, [REDACTED] (of Barclays) explained to [REDACTED]
 [REDACTED] (of ICAP) that [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]
 [REDACTED]

[REDACTED]¹⁹³

281. On April 30, 2008, [REDACTED] (BNPP) sent a message to [REDACTED] (ICAP) saying [REDACTED]
 [REDACTED]

¹⁹² ICM-000037776 (emphasis added).

¹⁹³ BARC-IFX-C_00000008.

[REDACTED] 194

[REDACTED] confirmed at deposition that, in this message, he was telling [REDACTED] that he [REDACTED]

[REDACTED] 195

282. On May 16, 2008, [REDACTED] (of ICAP) apologized to [REDACTED] (of BNPP)

[REDACTED] and

[REDACTED]

[REDACTED] 196

283. On June 23, 2008, [REDACTED] (of ICAP) complained to [REDACTED] (of BNPP) about [REDACTED]

[REDACTED] 197

284. The evidence also contains multiple examples of instances where traders at the Dealer Defendants would complain if ICAP's "pecker" did not enter prices fast enough to reflect trades (including manipulative trades) that the Dealer Defendants were executing.¹⁹⁸

¹⁹⁴ BNPP_AK_00103365

¹⁹⁵ Deposition of [REDACTED] (June 30, 2017), Tr. 179:2-5.

¹⁹⁶ ICM-000037769.

¹⁹⁷ ICM-000037806.

¹⁹⁸ See generally, e.g., ICM-000037777 (5/19/2008 emails between [REDACTED] BNPP)) [REDACTED]

[REDACTED] ICM-001516761 (transcript between [REDACTED] (of ICAP) and [REDACTED] (of ICAP) ([REDACTED])

V. **THE ISDA MASTER AGREEMENT**

285. **Generally.** In the early 1980's, the expansion of the relatively new swaps market was limited by the fact there was a stand-alone contract for each transaction. Negotiations of those contracts were time-consuming and expensive. In order to solve this problem the International Swaps and Derivatives Association ("ISDA") was formed in 1985 by a group of banks for the purpose of developing standardized terms for swaps.

286. ISDA published its first master agreement in 1987 followed by the 1992 ISDA Master Agreement (the "1992 Agreement") and the 2002 ISDA Master Agreement (the "2002 Agreement"). As a market participant familiar with industry standard practices, it was my experience that during the Class Period interest rate swaps, swaptions, constant maturity swaps, and other interest rate derivatives relevant to this case were all documented under either a 1992 Agreement or a 2002 Agreement.

287. Each ISDA Master Agreement is a standard printed form. Attached to the printed form is a schedule in which two parties make selections called for by the printed form in order to establish a contractual framework for derivatives transactions that they enter into over time. Each ISDA Master Agreement provides that the printed form agreement, the schedule and all transactions under that agreement, including documents and other confirming evidence that sets out terms of transactions (defined as "Confirmations"), constitute part of single unified agreement.

288. The financial and other terms of individual transactions are generally specified by reference to defined terms contained in definition books published by ISDA. As a market participant familiar with industry standard practices, it was my experience that during the Class Period the defined terms used to establish the financial and other terms for interest rate swaps, swaptions, constant maturity swaps, and other interest rate derivatives relevant to this case were incorporated by reference to either the 2000 ISDA Definitions or the 2006 ISDA Definitions.

289. **The Calculation Agent.** One election to be made in the schedule to an ISDA master agreement is to designate a “Calculation Agent.” Although a third party may be designated to be the Calculation Agent, as a standard industry practice one of the parties is usually designated to be the Calculation Agent, and in an ISDA Master Agreement between a dealer and an end user it is the dealer that is usually designated to be the Calculation Agent.

290. A Calculation Agent has a wide variety of responsibilities in connection with interest rate and currency derivatives to determine the exact amounts to be paid over the life of those transactions. The 2006 ISDA Definitions describe the responsibilities of a Calculation Agent as follows (emphasis added):

Section 4.14. Calculation Agent. “Calculation Agent” means the party to a Swap Transaction or a third party designated as such for the Swap Transaction and responsible for: (a) calculating the applicable Floating Rate, if any, for each Payment Date or for each Calculation Period or Compounding Period; (b) calculating any Floating Amount payable on each Payment Date or for each Calculation Period; (c) calculating any Fixed Amount payable on each Payment Date or for each Calculation Period; (d) calculating a Currency Amount by reference to a Currency Amount in another currency; (e) giving notice to the parties to the Swap Transaction on the Calculation Date for each Payment Date or for each Calculation Period, specifying (i) the Payment Date, (ii) the party or parties required to make the payment or payments then due, (iii) the amount or amounts of the payment or payments then due and (iv) reasonable details as to how the amount or amounts were determined; (f) if, after notice is given, there is a change in the number of days in the relevant Calculation Period and the amount or amounts of the payment or payments due for that payment Date or for that Calculation Period, promptly giving the parties to the Swap Transaction notice of those changes, with reasonable details as to how those changes were determined; (g) determining a Settlement Rate if fewer than three quotations are provided by the Cash Settlement Reference Banks; (h) selecting leading dealers to act as Cash Settlement Reference banks, if relevant; (i) *determining any Cash Settlement Amount, if relevant*; (j) determining a Currency Exchange Rate for a Mark-to-market Currency Swap, if relevant and (k) performing any other duties specified in a Confirmation as being duties required to be performed by the Calculation Agent. Whenever the Calculation Agent is required to select banks or dealers for purposes of making any calculation or determination or to select any exchange rate, the Calculation Agent will make the selection in good faith after consultation with the other party (for the parties, if the Calculation Agent is a third party), if practicable, for purposes of obtaining a representative rate that will reasonably reflect conditions prevailing at the time in the relevant market or designating a freely convertible currency, as the case may be. *Whenever the calculation Agent is required to act, make a determination or to exercise*

judgment in any other way, it will do so in good faith and in a commercially reasonable manner.

291. A “Cash Settlement Amount” under the 2006 ISDA Definitions for “a Swaption to which Cash Settlement is applicable” is the amount Seller pays to Buyer “if Buyer is the party which is in-the-money. . . .”¹⁹⁹

292. The 2000 ISDA Definitions contain a similar definition of “Calculation Agent,” including that the Calculation Agent is responsible for “determining any Cash Settlement Amount, if relevant. . . .”²⁰⁰ That definition also has the following standard for all actions of the Calculation Agent: “[w]henver the Calculation Agent is required to act or to exercise judgment in any other way, it will do so in good faith and in a commercially reasonable manner.”

293. **ISDAfix Rates.** ISDA announced on March 25, 1998 that it was inaugurating a par rate screen to provide mid-market swap rates to dealers and end users. ISDA described this service, “as another step by the swaps industry to increase transparency and price certainty for dealers and end-users in the growing market for privately negotiated derivatives. . . .”²⁰¹ ISDA explained that “the new benchmark service will provide a par swap curve from independently calculated reference values for cash-settled swap options quoted by acknowledged market makers as of 11:00 a.m. local time. . . .”²⁰² ISDA also noted in the March 25, 1998 press release that the “primary purpose” of the new service “is to establish authoritative values against which exercised swap options can be settled as well as to serve other valuation needs, for example the cash settling of interest rate swaps.”²⁰³

¹⁹⁹ 2006 ISDA Definitions, Section 18.1.

²⁰⁰ 2000 ISDA Definitions, Section 4.14.

²⁰¹ ISDA Press Release, *ISDA To Introduce Screen Service for Swap Rates and Spreads With Reuters, Intercapital Brokers and Leading Swap Dealers* (Mar. 25, 1998) available at http://www.isda.org/press/a50398_1.html.

²⁰² *Id.*

²⁰³ *Id.*

294. The 2000 ISDA Definitions adopted what became known as the ISDAfix benchmark rates for use in settling swaptions. The 2000 ISDA Definitions established that the Settlement Rate for a cash-settled swaption is determined by reference to the relevant ISDAfix Page when “‘ISDA Source’ is specified in the related Confirmation. . . .”²⁰⁴ In that case the Settlement Rate is “the par swap rate for swaps in the currency in which the Relevant Swap Transaction is denominated for a period equivalent to the remaining Term of the Relevant Swap Transaction which appears on the relevant ISDAfix Page as of the Cash Settlement Valuation Time on the Cash Settlement Valuation Date.”²⁰⁵ Finally, the 2000 ISDA Definitions stated that “ISDAFIX Page” “means, in respect of a Swap Transaction and in respect of a Cash Settlement Valuation Date or an Exercise Date, whichever of the Reuters Screen ISDAFIX pages is designated for purposes of displaying par swap rates for swaps in the currency of denomination of the Relevant Swap Transaction on that Cash Settlement Valuation Date or that Exercise Date.”²⁰⁶

295. Similarly, the 2006 ISDA Definitions contained as defined terms “ISDA Source” and “ISDAfix Page,” which facilitated the use of ISDAfix rates to determine the Cash Settlement Amount for cash-settled swaptions.²⁰⁷

296. Based on my experience as a market participant, during the Class Period it was the standard practice in the industry to settle cash-settled swaptions using ISDAfix rates to calculate the Cash Settlement Amount.

297. Constant maturity swaps are similar to vanilla interest rate swaps, but the interest rate for one leg is reset periodically with reference to a benchmark index. During the Class Period, it was standard industry practice to reset that leg of the constant maturity swaps with reference to

²⁰⁴ 2000 ISDA Definitions, Section 17.2(f).

²⁰⁵ *Id.*

²⁰⁶ ISDA 2000 Definitions, Section 17.2(n).

²⁰⁷ 2006 ISDA Definitions, Art 15.1(f)(i) (definition of “Settlement Rate”).

an ISDAfix rate. Steepeners and flatteners are interest rate derivatives the payoff for which is linked to the shape of the yield curve. In a steepener, the steeper the yield curve (*i.e.*, the higher that long-term rates are compared to short-term rates at the point in time when an amount due is calculated) the greater the payoff to the purchaser of the trade. Conversely, in a flattener, the flatter the yield curve at that point in time, the greater the payoff to the purchaser of the trade. During the Class Period it was standard industry practice for steepeners and flatteners to use ISDAfix rates of two different maturities (*e.g.*, the difference between the 30-year rate and the 2-year rate) to determine amounts due periodically to the purchaser of the trade.

* * *

298. The above represents my opinions as of the date of this report. I reserve the right to supplement or amend my opinions, including in response to any opinions that might be expressed by experts retained by Defendants, or as I receive new information in respect of this case.

July 28, 2017



Robert Farrell

APPENDIX A – Curriculum Vitae

Robert Farrell

**42 Rivers Edge Dr.
Colts Neck NJ 07722**

Tomoro LLC

Partner

2016-Present

- Investment manager – family office.

Blanton Research

Co-Founder

2015 – Present

- Provide consulting and advisory services specializing in securities trading, valuation and market practice

TP Americas LLC, New York, NY

2014 – 2016

Group Head / Managing Director

- Successfully completed a term contract to create an exchange traded derivative desk.
- Established relationship with clearing FCMs and local market makers.
- Hired and managed a team of execution professionals and strategists.
- Developed fixed income, equity and volatility trading and hedging strategies for a client base consisting of banks, insurance companies and hedge funds.

CRT Capital LLC, Stamford CT

2013 – 2014

Treasurer/Managing Director

- Chair of the Asset Liability Committee.
- Oversaw capital allocation, firm financing, liquidity and cash management of the firm's 250mm of equity capital and 10 billion USD balance sheet comprised of US Treasuries and Agencies, MBS, EM, Corp Debt, Equities and Private Placements
- Developed detailed stress tests that validated asset liquidity on a monthly basis
- Resigned proposed merger with Amherst Pierpoint.

First New York LLC, New York City, NY

2011 – 2013

Senior Portfolio Manager/Head of US Non Credit Trading

- Global Macro portfolio manager transacting in liquid G10 markets.
- Coordinated prime broker relationships.
- Worked with partners to obtain bank facilities, both collateralized and unsecured.

Morgan Stanley, Red Bank NJ

2009 – 2011

Portfolio Manager

- Portfolio manager actively managing 250mm of diversified fixed income portfolios in managed accounts for family offices, foundations and public entities.

Countrywide Capital Markets, Calabasas CA

2007 – 2008

Executive Vice President

- Trading and Product manager for rates desk including market making, underwriting, proprietary trading and financing.
- Senior member of the capital markets management committee responsible for liquidity stress testing and coordinating credit facilities.
- Products traded include US dollar interest rate derivatives and options, US Government and agency securities and global structured products.

AFG Advisors, Red Bank NJ and Greenwich CT

2005 – 2007

Managing Partner and CIO

- Co-Founder and Chief Investment Officer of AFG's Relative Value Opportunity Fund, a boutique 50mm global macro hedge fund focusing on fixed income and volatility strategies
- Responsible for portfolio management and capital allocation

Soros Fund Management New York City, New York

1999 – 2005

Treasurer and Senior Portfolio Manager

- Treasurer of Soros Fund Management, coordinating prime brokerage relationships, secured financing agreements and cash management.
- Promoted to portfolio manager, starting with a 50mm of risk capital.
- Allocated additional capital and responsibility for 5 successive years based on performance ultimately managing 250mm of risk capital and co-managed an additional 250mm.
- Gross returns of 18% annualized over 5 years.
- Strategy focused on fixed income relative value and macro positioning. Products traded included US, European and Japanese interest rate, FX and commodity indices.

Bankers Trust Company, New York City New York

1988 – 1999

Managing Director, Deputy Head of Global Funding

- Manager of a team of 40 professionals across US, Europe and Asia
- Responsible for funding the firm's \$120 billion balance sheet
- Worked extensively with rating agencies and regulators developing detailed liquidity stress test models.
- Responsible for managing the firm's \$7 billion investment account, and issuance of all long term and short term debt including CD's, MTN's, subordinated debt and capital securities.

EDUCATION AND PERSONAL

BS Finance 1985, Fairfield University, Fairfield CT

General Securities Principal, Series 24;

Registered Representative, Series 7, Series 65, 63, Futures Series 3

APPENDIX B – Materials Relied Upon

All documents, audio files, audio transcripts, deposition transcripts, trade data, CFTC Orders, internet webpages, news articles, or other materials as cited or expressly referenced in this Report.

Expert Report of Michael A. Williams, Ph.D (July 28, 2017).

APPENDIX C: GLOSSARY OF COMMON TERMS

American Style Option: An option that can be exercised at any time from inception as opposed to a European Style option which can only be exercised at expiry.

Accreting Swap: An exchange of interest rate payments at regular intervals based upon pre-set indices and notional amounts in which the notional amounts decrease over time.

Arbitrage: The act of taking advantage of differences in price between markets. The term also may refer to speculators who take positions on the correlation between two comparable asset types.

At-the-Market: A type of financial transaction in which the order to buy or sell is executed at the current prevailing market price.

At-the-Money: An option whose strike price is equal to the current price in the underlying market.

Average Rate Options: An option whose payout at expiry is determined by the difference between its strike and a calculated average market rate where the period, frequency and source of observation for the calculation of the average market rate are specified at the inception of the contract.

Barrier Options: An option contract for which the maturity, strike price and underlying are specified at inception in addition to a trigger price. The trigger price determines whether or not the option actually exists. In the case of a knock-in option, the barrier option does not exist until the trigger is touched. For a knock-out option, the option exists until the trigger is touched.

Basis: The difference in price or yield between comparable asset types traded in different market. For example, a 10 year US Government security yield versus the yield on a 10 year note contract on a futures exchange.

Bermudan Style Option: The Bermudan is a cross between European and American style options. While a European style option can be exercised at ONE discrete period and an American style option can be exercised continuously (any day), the Bermudan can be exercised at multiple discrete periods, such as quarterly or semi-annually, over the term of the option

Black-Scholes: A closed-form solution (i.e. an equation) for valuing plain vanilla options developed by Fischer Black and Myron Scholes in 1973 for which they shared the Nobel Prize in Economics.

Call Option: A call option is a financial contract giving the owner the right but not the obligation to buy a pre-set amount of the underlying financial instrument at a pre-set price with a pre-set maturity date.

Cap: A cap is a financial term that limits (or caps) a specified floating rate. For example, if you own a bond that pays an interest rate that resets at 3 month Libor with a cap, one's payment will never be higher than the predetermined cap regardless of where index sets.

Cash Settlement: Some derivatives contracts are settled at maturity (or before maturity at closeout) by an exchange of cash from the party who is out-of-the-money to the party who is in-the-money.

CMS Swap: CMS stands for Constant Maturity Swap. In a normal Interest Rate Swap transaction, the Fixed Rate at the time of the transaction represents, for example, the 10-year swap rate on the day of the transaction. However, as the transaction goes through time and moves closer to expiry, the Fixed Rate leg's duration declines (after one year the transaction now represents a 9-year Fixed-Floating Rate Swap). A Constant Maturity Swap keeps the 10-year swap rate constant at 10 years.

Collar: A combination of options in which the holder of the contract has bought one out-of-the money option call (or put) and sold one (or more) out-of-the-money puts (or calls). Doing this locks in the minimum and maximum rates that the collar owner will use to transact in the underlying at expiry.

Commodity Swap: A contract in which counterparties agree to exchange payments related to indices, at least one of which (and possibly both) is a commodity index.

Convexity: A financial instrument is said to be convex if the financial instrument's price increases or decrease faster than corresponding changes in the underlying price. Securities that can prepay like Mortgage Backed Securities are considered negatively convex.

Correlation: Correlation is a statistical measure describing the extent to which prices on different instruments move together over time. Correlation can be positive or negative. Instruments that move together in the same direction to the same extent have highly positive correlations. Instruments that move together in opposite direction to the same extent have highly negative correlations.

Credit Risk: Credit risk is the risk of loss from a counterparty in default or from a change in the credit status of a counterparty that causes the value of their obligations to decrease.

Currency Swap: An exchange of interest rate payments in different currencies on a pre-set notional amount and about pre-determined interest rate indices in which the notional amounts are exchanged at inception of the contract and then re-exchanged at the termination of the contract at pre-set exchange rates.

Delta: The sensitivity of the change in a financial instrument's value to changes in the price of the underlying cash index. For an interest rate swap, the key measurement of risk is delta risk of "DV01," which measures the impact on interest rate swaps of a 1 basis point change in interest rates.

Documentation Risk: The risk of loss due to an inadequacy or other unforeseen aspect of the legal documentation behind the financial contract.

Duration: A weighted average of the cash flows for a fixed income instrument, expressed in terms of time.

Embedded Derivatives: Derivative contracts that exist as part of securities.

Equity Swap: A contract in which counterparties agree to exchange payments related to indices, at least one of which (and possibly both of which) is an equity index.

European Style Option: An option that can be exercised only at expiry as opposed to an American Style option that can be exercised at any time from inception of the contract.

Exchange Traded Contracts: Financial instruments listed on exchanges such as the Chicago Board of Trade or CME.

Exercise Price: The exercise price is the price at which a call's (put's) buyer can buy (or sell) the underlying instrument.

Exotic Derivatives: Any derivative contract that is not a plain vanilla contract. Examples include barrier options, average rate and average strike options, lookback options, chooser options, etc.

Floor: A floor is a financial term that guarantees (or floors) a specified floating rate. For example, if you own a bond that pays an interest rate that resets at 3 month Libor with a floor, one's payment will never be lower than the predetermined floor regardless of where index sets.

Forward Contracts: An over-the-counter obligation to buy or sell a financial instrument or to make a payment at some point in the future, the details of which were agreed between the two counterparties.

Forward or Delayed Start Swap: Any swap with a start that is later than the standard terms. This means that calculation of the cash flows does not begin immediately but at some pre-determined start date.

Forward Rate Agreements (FRAs): A forward rate agreement is a cash-settled obligation on interest rates for a pre-set period on a pre-set interest rate index with a forward start date. A 3×6 FRA on US dollar LIBOR (the London Interbank Offered Rate) is a contract between two parties obliging one to pay the other the difference between the FRA rate and the actual LIBOR rate observed for that period. In this example, the counterparties are contractually agreeing to a 3 month Libor rate 3 months forward.

Futures Contracts: An exchange-traded obligation to buy or sell a financial instrument or to make a payment at one of the exchange's fixed delivery dates. Settlement takes place through the exchange's clearinghouse.

Gamma: Gamma is the measure of rate of change of an option's delta.

Hedge: A transaction that offsets an exposure to fluctuations in financial prices of some other contract or business risk. It may consist of cash instruments or derivatives.

Historical Volatility: A measure of the actual volatility (a statistical measure of dispersion) observed in the marketplace.

Hybrid Security: Any security that includes more than one component. For example, a hybrid security might be a fixed income note that includes a foreign exchange option or a commodity price option.

In-The-Money: An option with positive intrinsic value is one where the strike price of the option is economically more favorable than the current market. For example, a strike price of call option at \$10 with a current market price of \$15 would have \$5 in the money.

Index-Amortizing Swaps: An interest rate swap in which the notional amount for the purposes of calculating cash flows decreases over the life of the contract in a pre-specified manner.

Interest Rate Swap: An exchange of cash flows based on a pre-set notional amount with a pre-determined schedule of payments and calculations. Usually, one counterparty will received fixed flows in exchange for making floating payments.

International Swaps and Derivatives Association (ISDA) Agreements: To minimize the legal risks of transacting with one another, counterparties established master legal agreements with detailed schedules that govern all derivatives transactions into which they may enter with one another.

Intrinsic Value: The economic value of a transaction that is “In the Money.” For example, if a strike on an option is \$10 and the current market is \$15, the option would have \$5 of intrinsic value.

Knock-in Option: An option with a built-in mechanism that triggers an option right if a certain price or yield level is touched or exceeded.

Knock-out Option: An option with a built-in trigger mechanism that renders an option worthless if a certain price or yield level is touched or exceeded.

LIBOR London Interbank Offer Rate: The average rate of interest paid by leading banks to loan unsecured monies to each other in the London deposit market.

Liquidity Risk (Transactional): The risk that a financial market entity will not be able to find a market price (or a price within a reasonable tolerance in terms of the deviation from prevailing or expected prices) for one or more of its financial contracts in the secondary market. Consider the case of a counterparty who buys a complex option. He is exposed to liquidity risk because of the possibility that he cannot find anyone to provide a price in the secondary market and because of the possibility that the price he obtains is very much against him and the theoretical price for the product.

Look-Back Options: An option which gives the owner the right to buy (sell) at the lowest (highest) price that traded in the underlying from the inception of the contract to its maturity, *i.e.*, the most favorable price that traded over the lifetime of the contract.

Margin: A credit-enhancement provision to master agreements and individual transactions in which one counterparty agrees to post a deposit of cash or other liquid financial instruments with its counterparties based upon changes in the market value of this transaction.

Mark to Market Accounting: A method of accounting most suited for financial instruments in which contracts are revalued at regular intervals using prevailing market prices. This method is employed by most trading firms allowing them to know the market value of their portfolio daily. The corresponding changes are recorded as gains or loss in their income statement.

Market Risk: The exposure to potential loss from fluctuations in market prices (as opposed to changes in credit status).

Market-Maker: A participant in the financial markets who guarantees to make simultaneously a bid and an offer for a financial contract.

Model: This is the type of valuation model used to value derivative options. There are many kinds, and their usage greatly depends on the type of option that is being valued.

Naked Option Writing: The act of selling options without having any offsetting exposure in the underlying cash instrument.

Netting: When there are cash flows in two directions between two counterparties, they can be consolidated into one net payment from one counterparty to the other thereby reducing the settlement risk involved.

Notional: The notional of a derivative transaction represents the amount payments are based off. For example, an interest rate Fixed to Floating swap with a notional of \$100mm means that the payments of both the Fixed and Floating leg are calculated off \$100mm.

Notification Days: Notification Days are a convention used for derivative transactions like Swaptions. The Notification Day for swaptions are generally two business days (backing out non-business days like weekends and market recognized holidays). That means that the holder of the swaption should notify the seller of the swaption of his intention to exercise two days prior to expiry.

OIS Swap: An OIS Swap or Overnight Index Swap is a transaction where one leg of the swap is a Fixed Rate and the Floating rate is calculated daily using the Federal Reserve Funds rate and is compounded every day. This interest rate swap allows for hedging or speculating on changes in Overnight Funding levels and risk.

Open Interest: Exchanges are required to post the number of outstanding long and short positions in their listed contracts. This constitutes the open interest in each contract.

Operational Risk: The potential for loss attributable to procedural errors or failures in internal control.

Option: The right but not the obligation to buy or sell some underlying financial instrument at a pre-determined rate on a pre-determined expiration date in a pre-set notional amount.

Out-of-The-Money Spot: An option with no intrinsic value with respect to the prevailing market spot rate. If the option were to mature immediately, the option holder would let it expire. For a call price to have intrinsic value, the strike must be less than the spot price. For a put price to have intrinsic value, the strike must be greater than the spot price.

Out-of-The-Money-Forward: An option with no intrinsic value with respect to the prevailing market forward rate. If the option were to mature immediately, the option holder would let it expire. For a call price to have intrinsic value, the strike must be less than the spot price. For a put price to have intrinsic value, the strike must be greater than the spot price.

Over-the-Counter: Any transaction that takes place between two counterparties and does not involve an exchange is said to be an over-the-counter transaction..

Payment Frequency: In a derivative transaction, the Payment Frequency is when each party makes payments to the other. For example, in an interest rate swap, the Fixed payer may pay Semi-Annually while the Floating Rate payer may pay Quarterly.

Premium: The cost associated with purchasing or selling an option, referring to the combination of intrinsic value and time value.

Put Option: A put option is a transaction giving the owner the right but not the obligation to sell a pre-set amount of the underlying financial instrument at a pre-set price with a pre-set maturity date.

Present Value: Present Value is a core principle of pricing any transaction, both derivative and cash, that relies on future payments of cash flows. Present Value represents what the future cash flows are worth today. A simple example would be a choice between receiving \$1 dollar today or \$1.05 in a year. Looking at where 1 year risk free (no credit or liquidity risk) rates are PRESENTLY, if the investor can take his \$1 dollar today and grow it by investing in the one-year risk free rate and end up with a value of \$1.05 in a year, he is indifferent between receiving \$1 dollar today or \$1.05 a year from now. As time goes on and interest rates change, the Present Value of the transaction changes as well. If risk free rates go up, the Present Value for the party receiving the fixed cash flow goes down and the opposite if risk free rates fall.

PV01: The PV01 refers to the Present Value of a derivative transaction. With an interest rate derivative, this measures the dollar value change if interest rates change by 1 basis point ($1/100^{\text{th}}$ of 1%). PV01 measures interest rate sensitivity for the derivative transaction

Regulatory Risk: The potential for loss stemming from changes in the regulatory environment pertaining to derivatives and financial contracts.

Reset Frequency: In a derivative transaction, the Floating Rate “resets” at some interval (Quarterly, Semi-Annually, Annually, etc.). The Reset Frequency defines the intervals the Floating Rate (like 3 month LIBOR) of the transaction Resets.

Rho: The sensitivity of a financial contract’s value to small changes in interest rates.

Settlement Risk: The risk of non-payment of an obligation by a counterparty to a transaction, exacerbated by mismatches in payment timings.

Speculation: Taking positions in financial instruments without having an underlying exposure that offsets the positions taken.

Spot: The price in the cash market for delivery using the standard market convention.

Spread: The difference in price or yield between two assets that differ by type of financial instrument, maturity, strike or some other factor. A swap spread is the difference in yield between an interest rate swap and the corresponding Treasury note or bond. A credit spread is the difference in yield between a corporate bond and the corresponding government bond. A yield curve spread is the spread between two government bonds of differing maturity.

Straddle: A Straddle is an option transaction whereby the Straddle Seller, sells both a put and call (or for Swaptions, a payer and receiver). The Straddle Buyer is the opposite profile. The seller would be characterized as a “Seller of Volatility” while the buyer is the opposite.

Standard Deviation: In finance, a statistical measure of dispersion of a time series around its mean; the expected value of the difference between the time series and its mean; the square root of the variance of the time series.

Stress Testing: The act of simulating different financial market conditions for their potential effects on a portfolio of financial instruments.

Strike Price: The price at which the holder of an option has the right to exercise the option if it is economic to do so at the appropriate point in time as delineated in the financial product's contract.

Structured Notes: Fixed income instruments with embedded derivatives. The coupon, interest or maturity proceeds are linked to a derivative formula.

Swaptions: Options on swaps.

Swaption Type: The Swaption Type defines both the maturity of the option and the underlying "Tenor". An example of Tenor would be options on 10-year swap. The 10 year would have referred to as "Tenor". So, a 1-year, 10-year Swaption would be a 1-year option on the 10-year swap rate. Swaptions can be defined as either "Payers" or "Receivers." The Payer Swaption gives the option holder the right to pay a pre-determined fixed rate on a swap at some point in the future. A Receiver Swaption is the opposite. The Payer holder wants rates to go up and the Receiver holder wants rates to go down.

Theta: The sensitivity of a derivative product's value to changes in the date, all other factors staying the same.

Time Value: For an option, time value is the difference between the intrinsic value and the premium.

Value at Risk or VAR: The calculated value of the maximum expected loss for a given portfolio over a defined time horizon (typically one day) and for a pre-set statistical confidence interval, under normal market conditions

Value of a Basis Point: The change in the value of a financial instrument attributable to a change in the relevant interest rate by 1 basis point (i.e. 1/100 of 1%).

Vega: The sensitivity of an option's value to changes in implied volatility, all other factors staying the same.

Volatility: Volatility is measurement of the dispersion of price movements for a specific financial product. Interest rate volatility attempts to measure the variability of yields or rates over specified periods of time.

Yield Curve: For a particular series of fixed income instruments such as government bonds, the graph of the yields to maturity of the series plotted by maturity.

Yield Curve Risk: The potential for loss due to shifts in the position or the shape of the yield curve.

Zero Coupon Instruments: Fixed income instruments that do not pay a coupon but only pay principal at maturity; trade at a discount to 100% of principal before maturity with the difference being the interest accrued.